CHAPTER 79

OIL

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This Table of Contents lists subjects contained in the Qantas 707-138 Maintenance Manual. Where these subjects conflict with those contained in Boeing 707 Stratoliner Maintenance Manual (Document D6-4004) the Company Manual will take precedence. Holders of Manuals when in receipt of Qantas Maintenance Manual revisions must revise the Table of Contents contained in the applicable chapter of both the Manuals.

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OIL

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[1] AA 707-123

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OIL SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil system includes the engine oil system, oil quantity indicating system, oil pressure indicating system, oil temperature indicating system and oil pressure warning system.

B. Coverage of the engine oil system is restricted to external features that include the oil tank, oil cooler, and ground cooling air ejector provisions. Oil filtration, pumps and internal lubrication arrangements are covered by Chapter 72, "ENGINE".

C. The lubricant used is synthetic chemical base oil, offering free flowing characteristics at extremely low temperatures and retaining proper viscosity at high operating temperatures. Refer to Chapter 12, "SERVICING" for engine oil servicing.

END

ENGINE OIL SYSTEM - DESCRIPTION AND OPERATION

1. General

A. Each engine has an oil system which provides a supply of oil to cool and lubricate engine gears and bearings. The oil is in turn cooled by air flow through an oil cooler assembly. During flight, ram air furnishes the air flow. During ground operation air flow through the cooler is induced by the ejection of sixteenth stage bleed air into the oil cooler exhaust duct.

NOTE: Refer to Chapter 72, "Engine" for coverage of those engine components that control and direct flow of lubrication through the engine from the inlet fitting to the outlet fitting. This section, 79-1-0, covers only the engine oil tank, oil cooler assembly and the ground cooling air ejector valve. (See figure 1.)

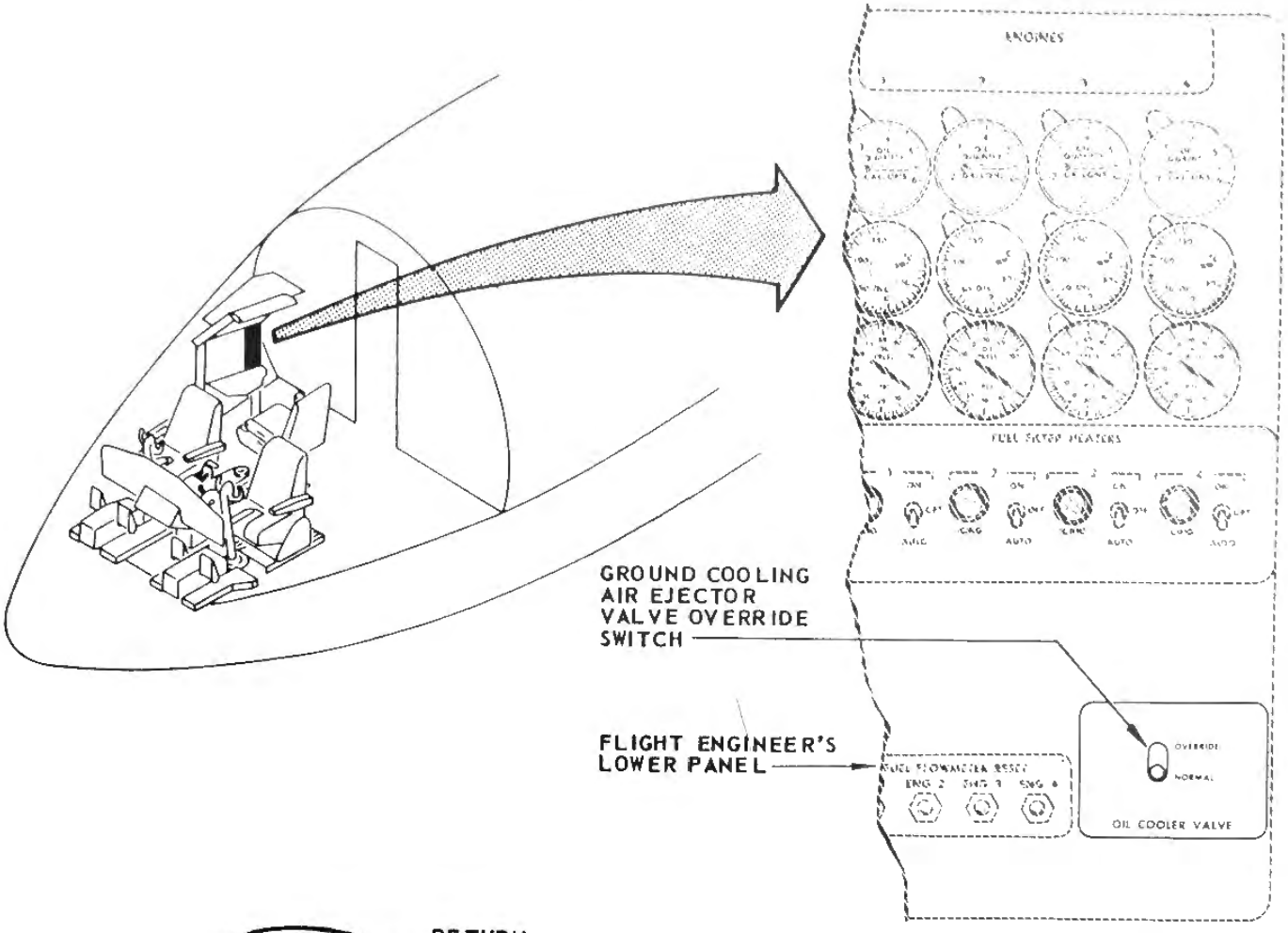
B. Oil flows by gravity from the oil tank to an engine pressure oil pump inside the engine. After leaving the pump the oil flows through an oil strainer, a pressure relief valve, an anti-siphon "U" tube and then to the various bearings and gears in the engine. Return oil is picked up by the scavenge pumps and returned to the oil tank by way of the oil cooler.

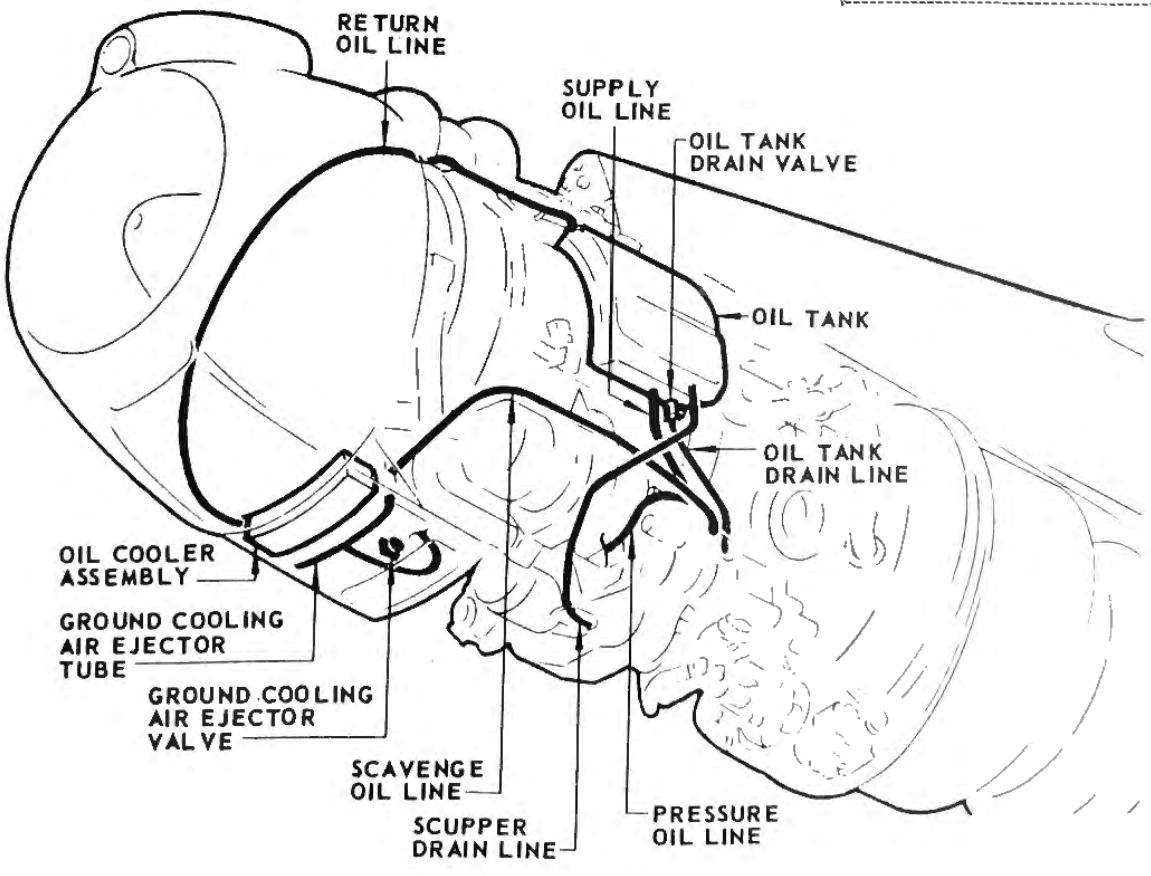
2. Engine Oil Tank

A. The engine oil tank stores and deaerates engine lubricating oil. The tank has an enclosed volume of 8.3 gallons. All engines require 0.7 gallons of oil in the tank to keep the engine pump properly primed. At each engine position the volume of oil between the sight glass and maximum fill position is 2 gallons. In engine positions No. 1 and 2 the tank contains 3.4 gallons below the sight glass. For engine positions No. 3 and 4 this volume is 3.8 gallons. All engines require 2 gallons of oil to fill the bearing galleries etc during engine operation, thus oil available for engine operation in positions No. 1 and 2 is 3.4 gallons and in positions No. 3 and 4, 3.8 gallons. The remaining volume in each tank is expansion space.

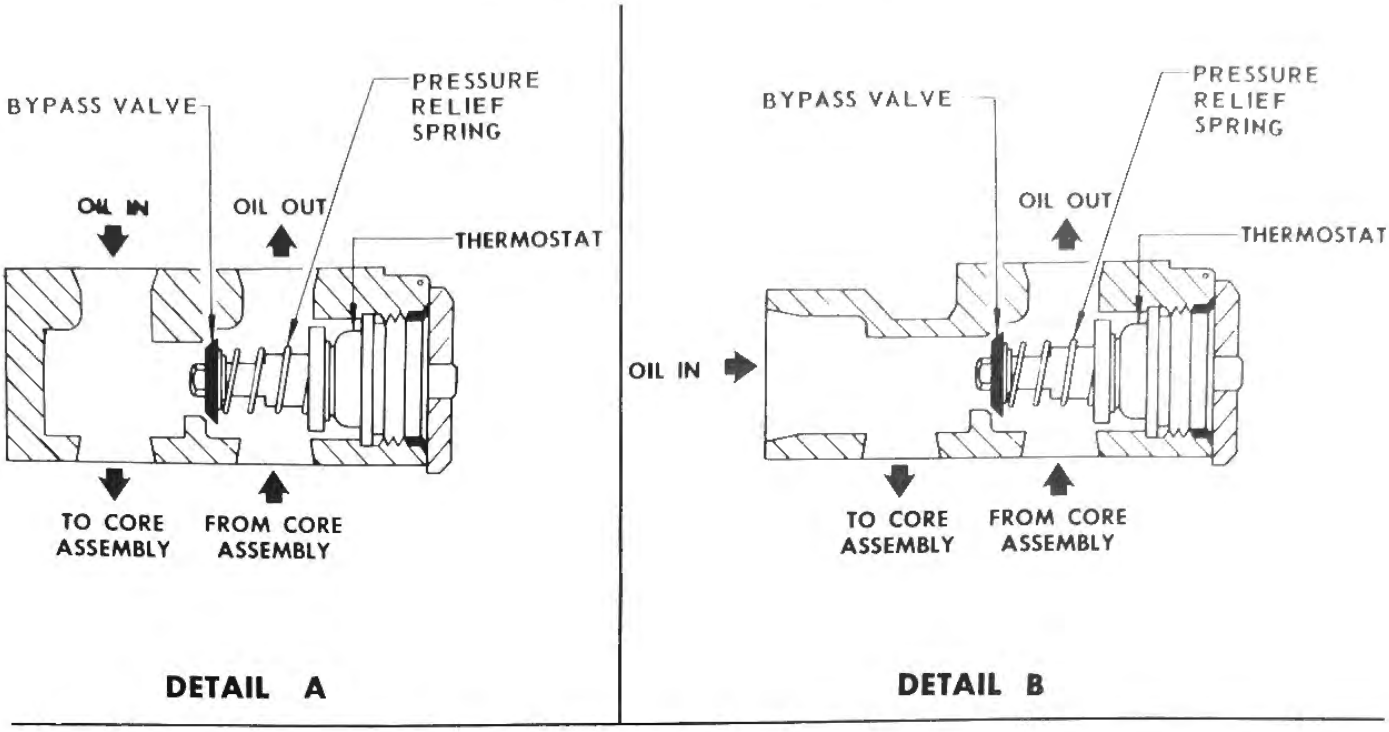
B. The tank assembly includes a deaerator inside the tank, a scupper drain at the filler cap well, a finger screen at the filler port, a sight glass about five inches below the filler cap, and a drain valve at the bottom of the tank. The oil tank is strapped to the upper left side of the front compressor case.

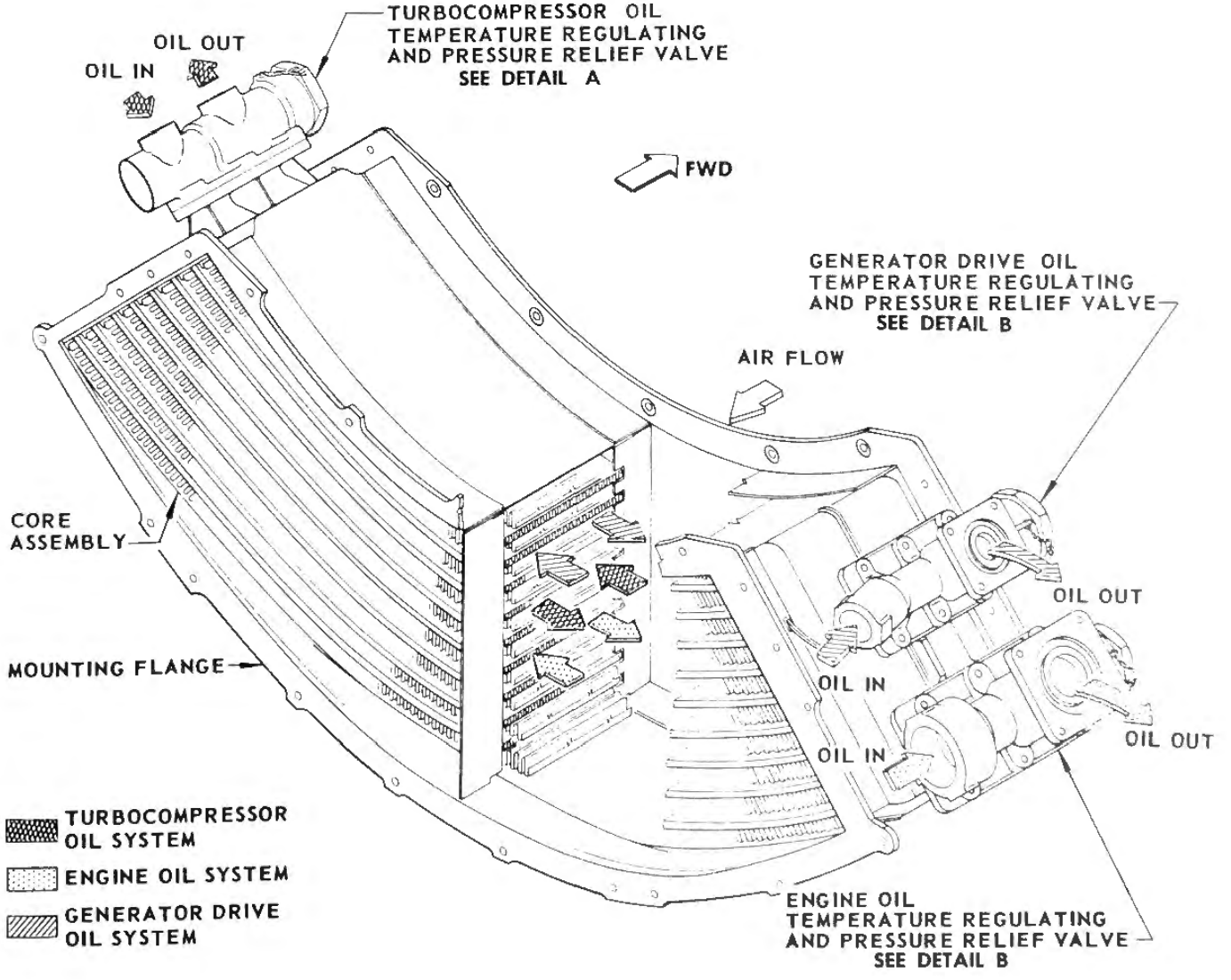
C. The deaerator separates most of the air from the returning oil, minimizing foaming, and the tank is vented directly to the engine breather chamber. The drain valve allows complete drainage of the tank and the sight glass indicates if the oil is above or below a predetermined level. The scupper drain collects and drains overboard any oil overfilled during servicing.





Engine Oil System Equipment Location
Figure 1





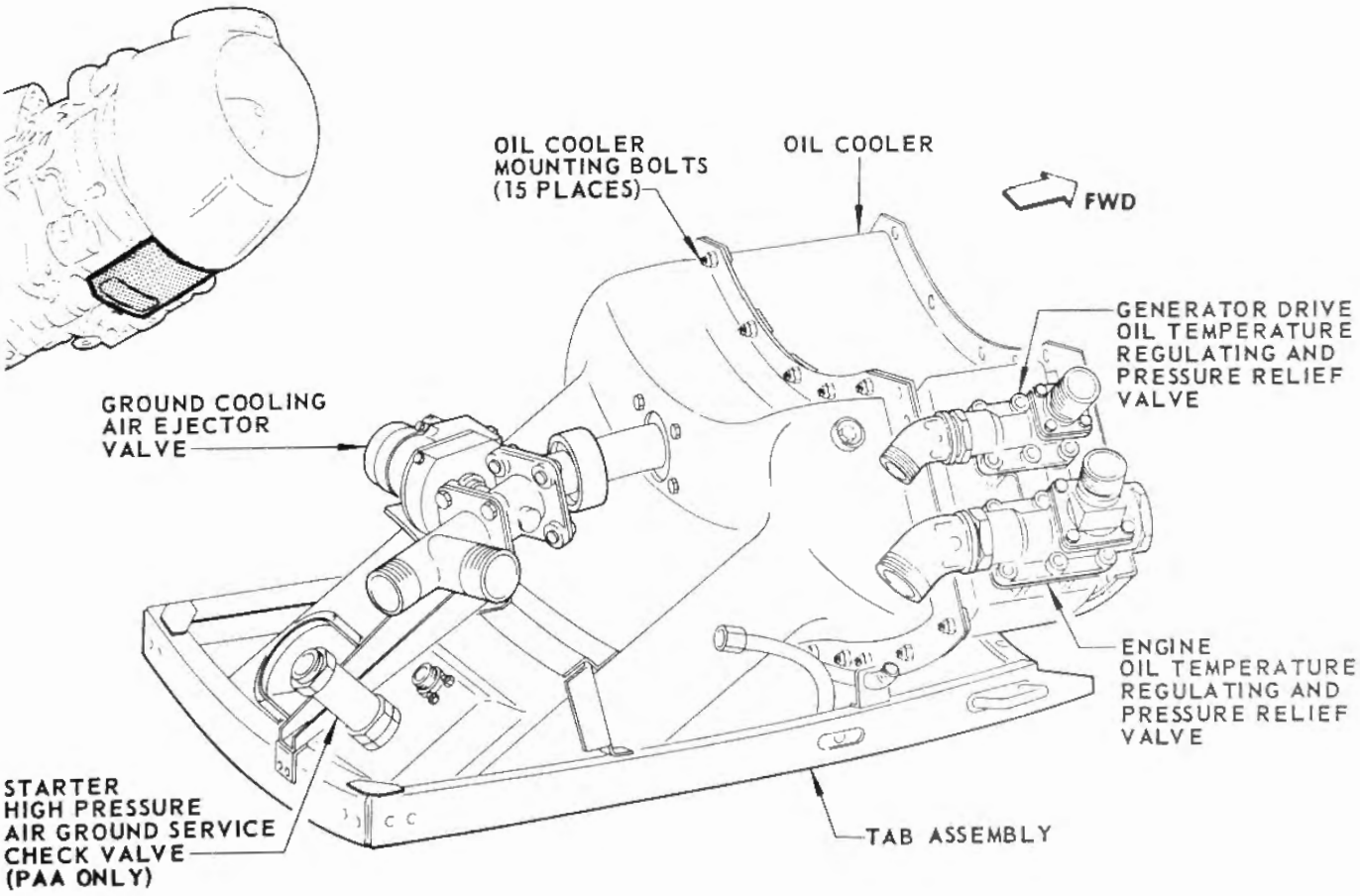
Oil Cooler and Bypass Valve Assembly
Figure 2

3. Oil Cooler Assembly

A. The oil cooler assembly regulates the temperature of engine oil, generator drive oil and turbo compressor oil. These three systems are identical in operation and differ only in respect to capacity. The cooler assembly consists of a plate and fin type core assembly which is divided into three parts. Each part is a separate set of passages with its own temperature regulating and pressure relief valves. (See figure 2.) The cooler assembly is located under the front compressor case just aft of the nose cowl. (See figure 1.)

B. Oil enters the cooler assembly at the oil-in port of the engine oil temperature regulating and pressure relief valve. (See figure 2.) When the oil is cold the thermostat will be contracted, holding the bypass valve open and allowing the oil to flow directly to the oil-out port without passing through the core assembly. As the oil becomes warm the thermostat will expand, gradually closing the bypass valve and forcing an increasing portion of the oil to flow through the core assembly. At approximately 85°C the bypass valve will be fully closed forcing all the oil to flow through the core assembly.

C. The bypass valve is held against its seat by the pressure relief spring. (See detail B, figure 2.) An oil pressure of approximately 50 psi will



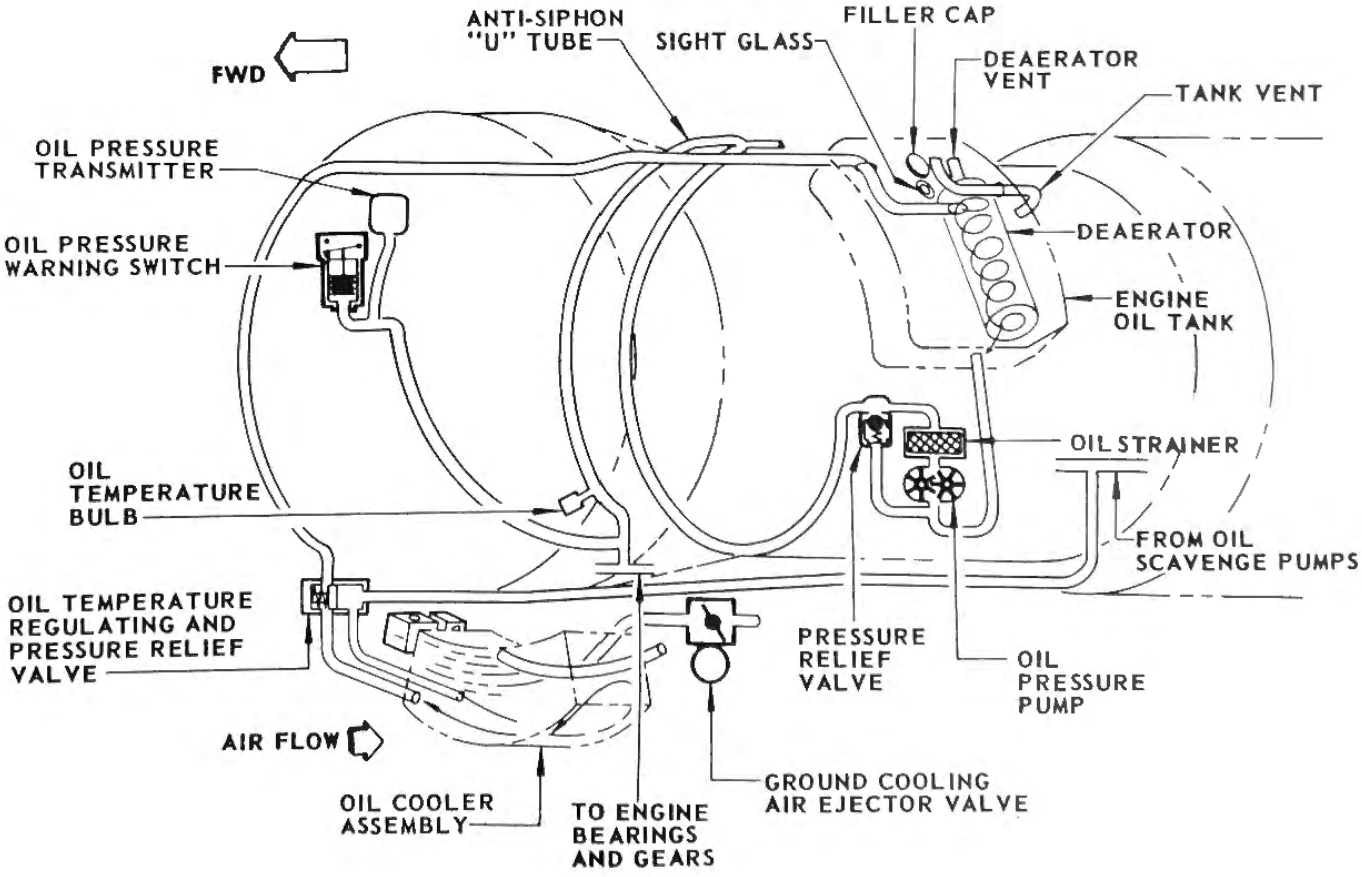
Oil Cooler and Tab Assembly
Figure 3

force the bypass valve off its seat allowing oil to pass directly to the oil-out port thereby protecting the core assembly from an excessive pressure buildup.

4. Ground Cooling Air Ejector Valve

A. The ground cooling air ejector valve is a motor driven butterfly valve which controls the sixteenth stage bleed air ejected into the oil cooler exhaust duct. The valve is mounted on the tab assembly just aft of the oil cooler assembly. (See figure 3.)

B. The ground cooling air ejector valves receive 28-volt d-c power through the radio and T-R circuit breaker panel (P5). The valves are controlled by a relay on the J1 relay shield which is in turn controlled by the landing gear safety switch. Manual control of the valves is accomplished through the ground cooling air ejector valve override switch on the flight engineer's lower panel. (See figure 1.)



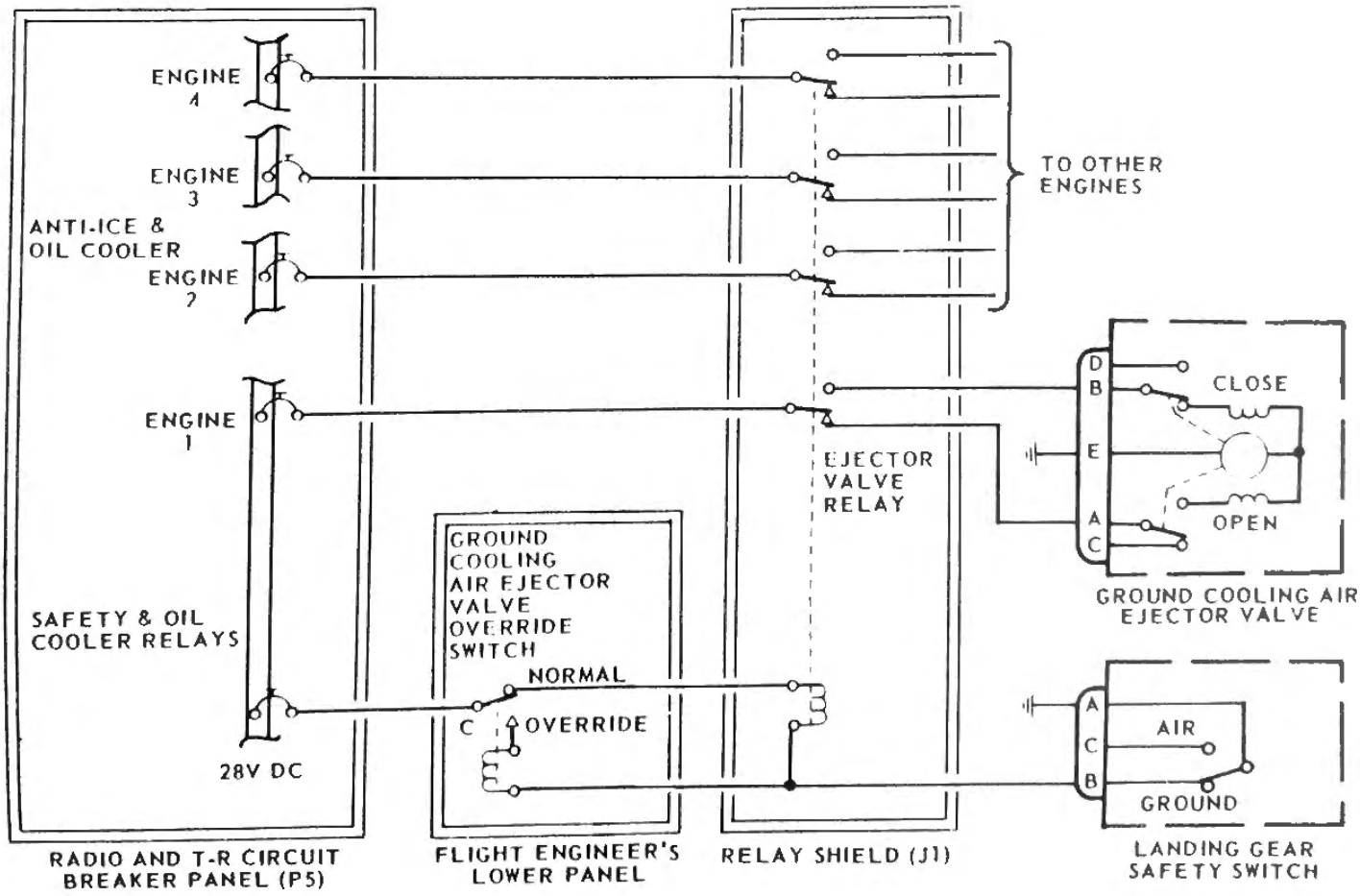
Engine Oil System Flow Diagram
Figure 4

5. Operation

A. Oil flows from the oil tank through the engine, through the oil cooler assembly, and back to the oil tank. (See figure 4.) The oil absorbs considerable heat during its trip through the engine. The oil cooler assembly dissipates this heat to outside air and regulates the temperature of the oil returned to the tank. Ram air provides air flow through the oil cooler assembly during flight. On the ground, cooling air is induced by sixteenth stage bleed air ejected into the oil cooler exhaust duct.

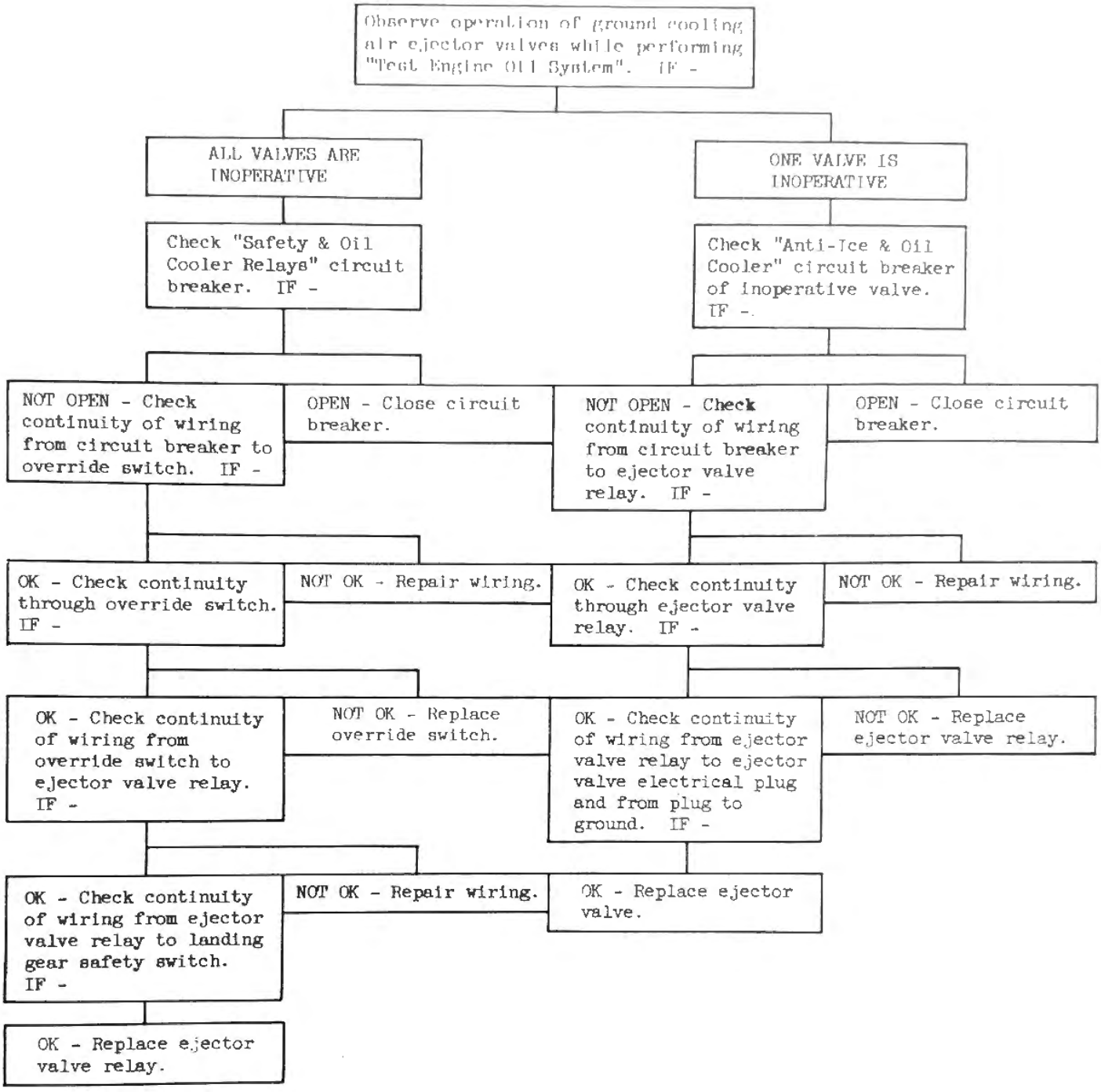
B. During normal ground operation the ejector valve relay is energized causing the valve to open. (See figure 5.) With the ground cooling air ejector valve open bleed air will flow into the ejector tube and out the oil cooler exhaust duct inducing air flow through the oil cooler assembly.

C. Just before take-off the ground cooling air ejector valve override switch is positioned "OVERRIDE". The override switch holding coil is energized, the ejector valve relay is de-energized and the valve will close. (See figure 5.) When the airplane leaves the ground the landing gear safety switch moves to the air position. The override switch holding coil is de-energized returning the switch to the "NORMAL" position and setting the system up to repeat the normal ground operation cycle when the airplane lands.



Ground Cooling Air Ejector System Electrical Circuit
Figure 5

ENGINE OIL SYSTEM - TROUBLE SHOOTING



END

ENGINE OIL SYSTEM - MAINTENANCE PRACTICES

1. Servicing Engine Oil System

A. General

(1) Servicing the engine oil system consists of either replenishing or changing the oil supply. Engine oil change procedures are covered in this section. Refer to Oil Servicing, Chapter 12, for replenishment procedures.

(2) Deleted.

B. Materials and Equipment

(1) 10 gallon capacity container

(2) Two-one gallon containers

C. Change Engine Oil (See figure 201.)

(1) Open left and right side cowl panels.

(2) With suitable receptacles placed to catch drained oil open oil tank drain valve (detail A), remove oil strainer housing drain plug (detail A), accessory drive housing drain plug (view 1), and accessory drive adapter drain plug (view 2).

(3) When oil drainage has receded to a slow drip, replace drain plugs removed in step (2) and close oil tank drain valve.

(4) Fill oil tank, secure filler cap and close side cowl panels.

2. Adjustment/Test Engine Oil System

A. General

(1) The ground cooling air ejector system is the only portion of the engine oil system which lends itself to a formal test procedure. Testing the ground cooling air ejector system involves operating the system through its three conditions of operation (normal ground, ground override and normal air), and checking for correct valve position during each condition.

B. Materials and Equipment

(1) External power cart

C. Test Engine Oil System

(1) Connect external power and open left and right side cowl panels.

(2) Determine that safety and oil cooler relays circuit breaker and anti-icing and oil cooler circuit breakers are closed.

(3) Check position of ground cooling air ejector valve override switch. Switch should be in "NORMAL" position.

(4) Check position of ground cooling air ejector valves by observing position indicator at each valve. Valves should be open.

(5) Move ground cooling air ejector valve override switch to "OVERRIDE" position. Switch should hold in this position.

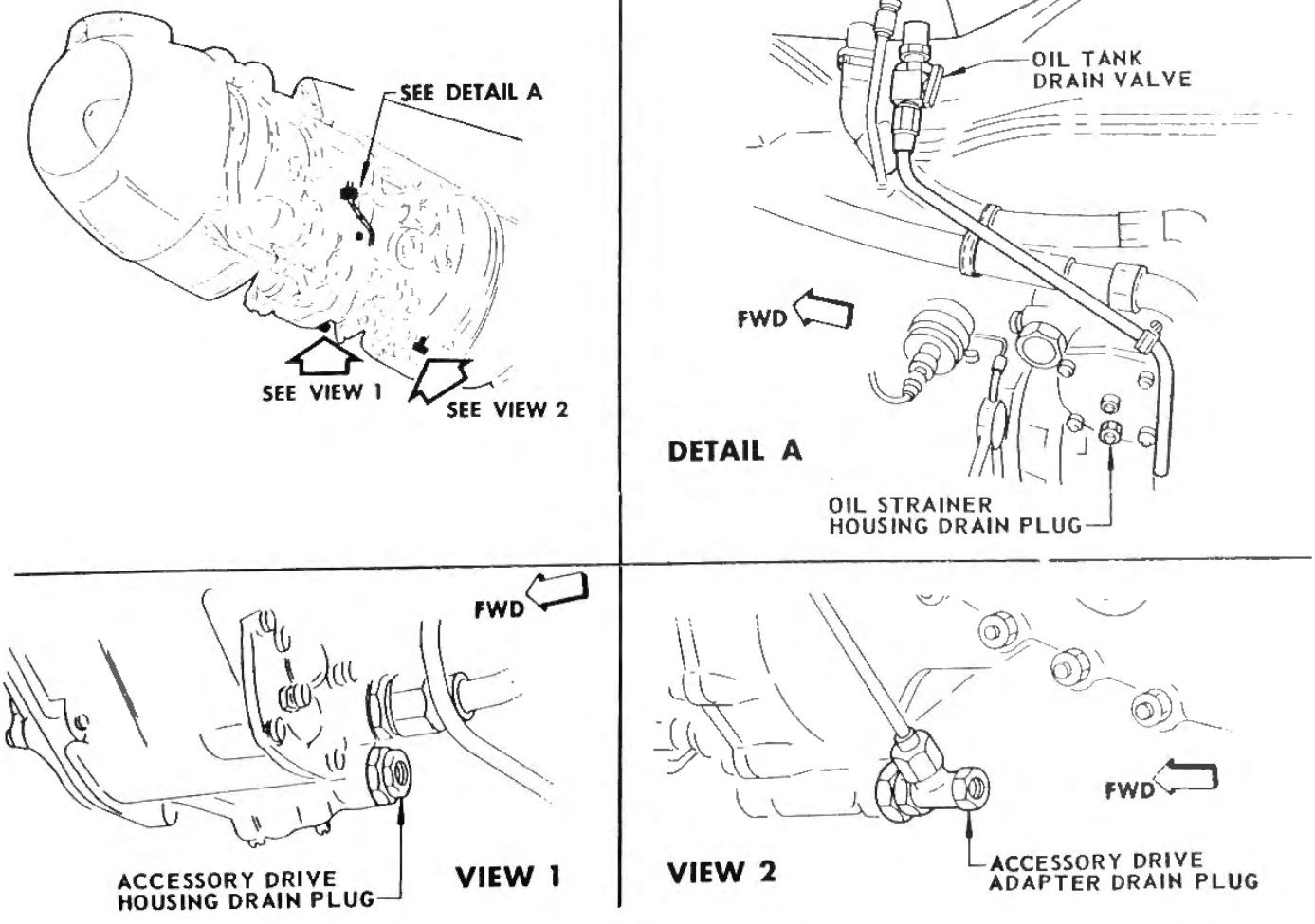
(6) Check position of valves as in step (3). Valves should be closed.

(7) Momentarily open safety and oil cooler relays circuit breaker.

WARNING: WHEN CIRCUIT BREAKER IS PULLED FOR EXTENDED PERIODS, THE "DRAIN MAST HEATER" CIRCUIT BREAKER MUST ALSO BE PULLED TO PREVENT OVERHEATING.

(8) Check position of ground cooling air ejector valve override switch. Switch should have returned to "NORMAL" position.

(9) Close side cowl panels and remove external power.



Engine Oil System Drains
Figure 201

ENGINE OIL TANK - MAINTENANCE PRACTICES

1. Removal/Installation Engine Oil Tank

A. Materials and Equipment

(1) Eight gallon capacity container

B. Remove Engine Oil Tank (See figure 201.)

(1) Remove left side cowl panel.

(2) With container under oil tank drain line (4), drain engine oil tank.

(3) Disconnect oil return line (10).

(4) Remove vent fitting mounting bolts, lift vent fitting (13) clear of engine and remove fitting and vent connector (12) from oil tank.

(5) Disconnect scupper drain line (3).

(6) Disconnect oil tank drain line (4) at oil tank drain valve and remove valve (5) from tank.

(7) Disconnect oil supply line (6).

(8) Remove oil quantity transmitter (7).

(a) Open applicable oil quantity indicating system circuit breakers.

(b) Remove transmitter electrical plug.

(c) Remove bonding jumper.

(d) Unscrew transmitter and remove transmitter and O-ring from oil tank.

(9) Remove four screws securing wiring shield (2) to gain access to mounting strap tee bolts.

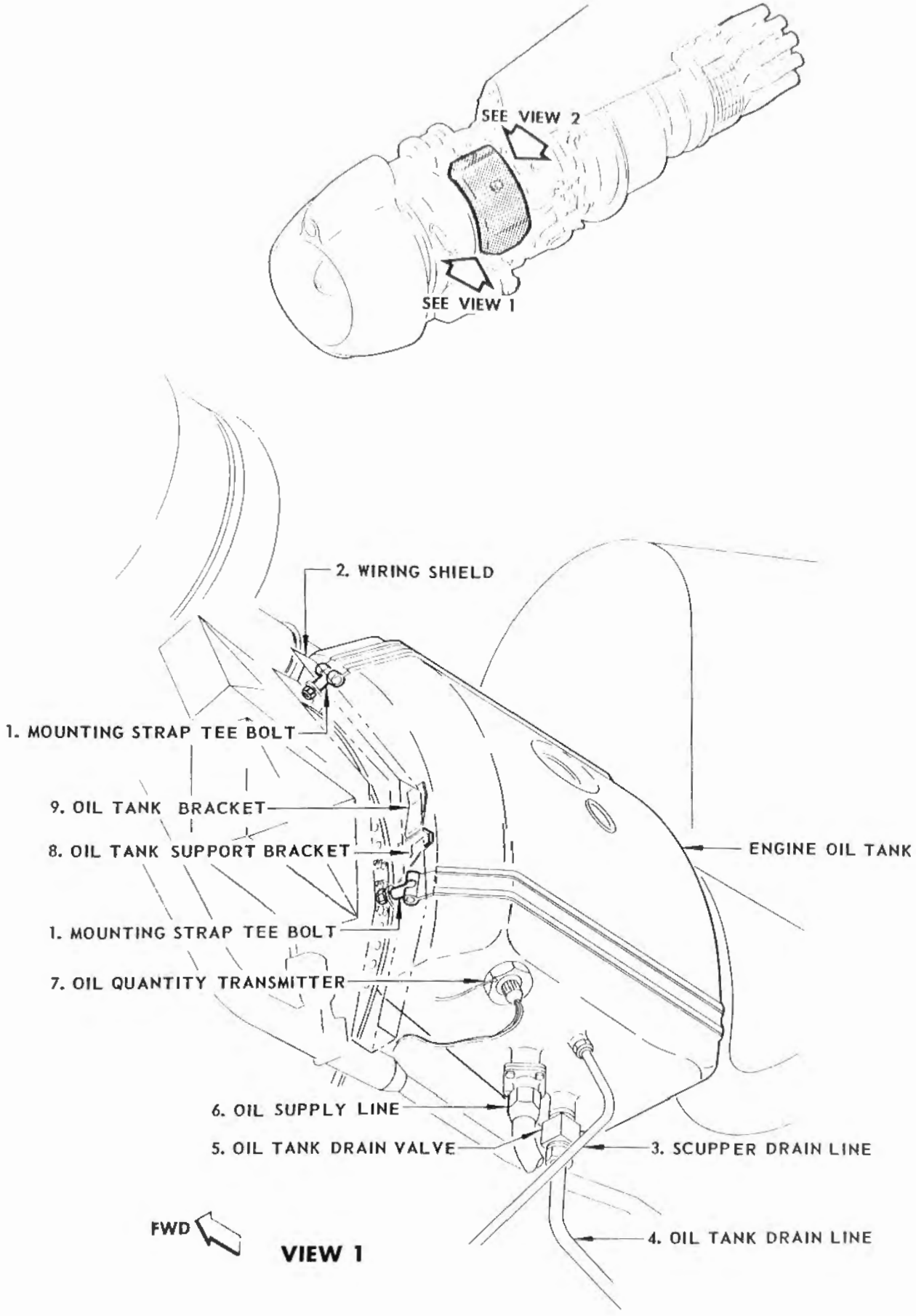
(10) Remove nuts from mounting strap tee bolts (1).

(11) Free tank from mounting straps (11 and 14) and lift oil tank from engine.

(12) Remove sight glass cap (19).

(13) Remove sight glass (18).

(14) Remove outer gasket (17), reflector (16) and inner gasket (15).



Engine Oil Tank Installation
Figure 201 (Sheet 1 of 2)

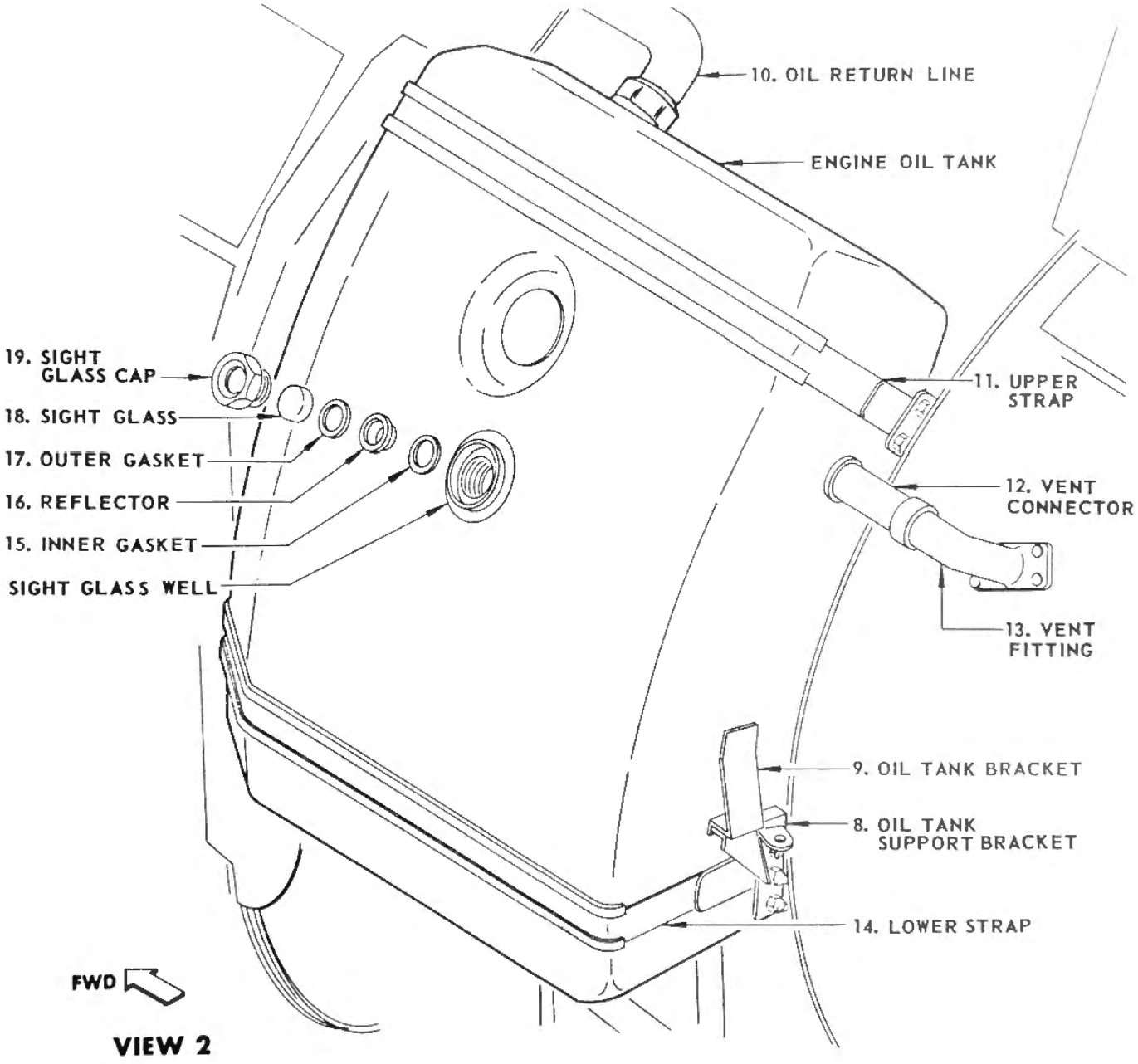
C. Install Engine Oil Tank (See figure 201.)

(1) Install new inner gasket (15), reflector (16) and new outer gasket (17).

(2) Install sight glass (18) and sight glass cap (19) with a wrenching torque of 25 pound-inches.

(3) Slip oil tank into position under mounting straps (11 and 14) so that oil tank brackets (9) rest upon oil tank support brackets (8).

(4) Install nuts on oil tank mounting strap tee bolts (1).



(5) Replace wiring shield (2) and install four securing screws.

(6) Connect oil supply line (6).

(7) Install oil tank drain valve (5) and connect drain line (4).

(8) Connect scupper drain line (3).

(9) Install oil tank vent connector (12) and vent fitting (13) with new O-rings.

(10) Connect oil return line (10).

(11) Install oil quantity transmitter (7).

(a) With a new O-ring in place install oil quantity transmitter with a wrenching torque of 700 to 900 pound-inches.

(b) Install safety wire.

(c) Install bonding jumper.

(d) Connect transmitter electrical plug.

(12) Fill engine oil tank to wet surfaces of oil quantity transmitter. Refer to "OIL SERVICING", Chapter 12.

(13) Adjust oil quantity indicating system. See 79-2-0.

(14) Replace left side cowl panel.

END

OIL COOLER ASSEMBLY - MAINTENANCE PRACTICES

1. Removal/Installation Oil Cooler Assembly

A. Remove Oil Cooler Assembly (See figure 201.)

(1) Open applicable ground cooling air ejector valve circuit breaker.

(2) Open left and right side cowl panels.

(3) Loosen generator cooling air inlet duct clamps (11) and remove duct (14).

(4) Remove generator ground cooling air exhaust duct support brackets (8), loosen clamps (6), and remove duct (10).

(5) With a suitable receptacle placed to catch oil, remove turbocompressor oil lines (3) from turbocompressor oil temperature regulating and pressure relief valve (4).

(6) Disconnect vent line (13) at elbow (12).

(7) Disconnect ground cooling air ejector valve electrical plug (9).

(8) Disconnect drain line (24) at tee fitting (25).

(9) Disconnect vent line (22) at elbow (23), and remove support bracket which attaches vent line to oil cooler.

(10) On PAA airplanes remove starter high pressure air ground service line (28) from check valve (27).

(11) On PAA airplanes disconnect starter high pressure air ground service electrical plug (26).

(12) Disconnect nose cowl anti-icing lines (15) at tee fitting (29).

(13) Remove interphone jack mounting screws (2) and free interphone jack from tab assembly.

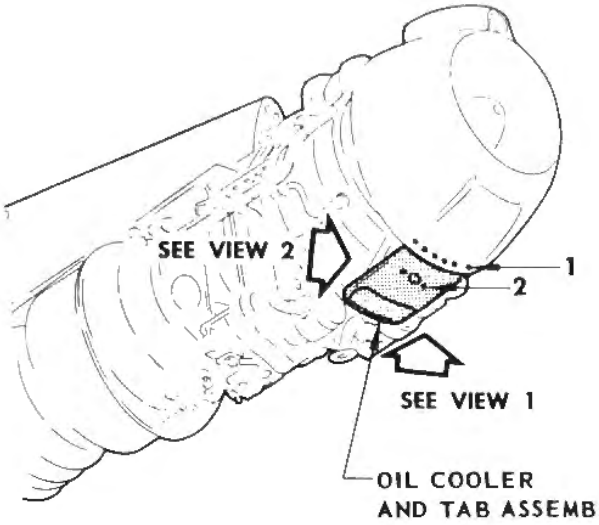
(14) With a suitable receptacle placed to catch oil, remove engine oil lines (19) and generator drive oil lines (16) from engine oil temperature regulating and pressure relief valve (20) and generator drive oil temperature regulating and pressure relief valve (18).

(15) Remove six tab assembly mounting screws (1).

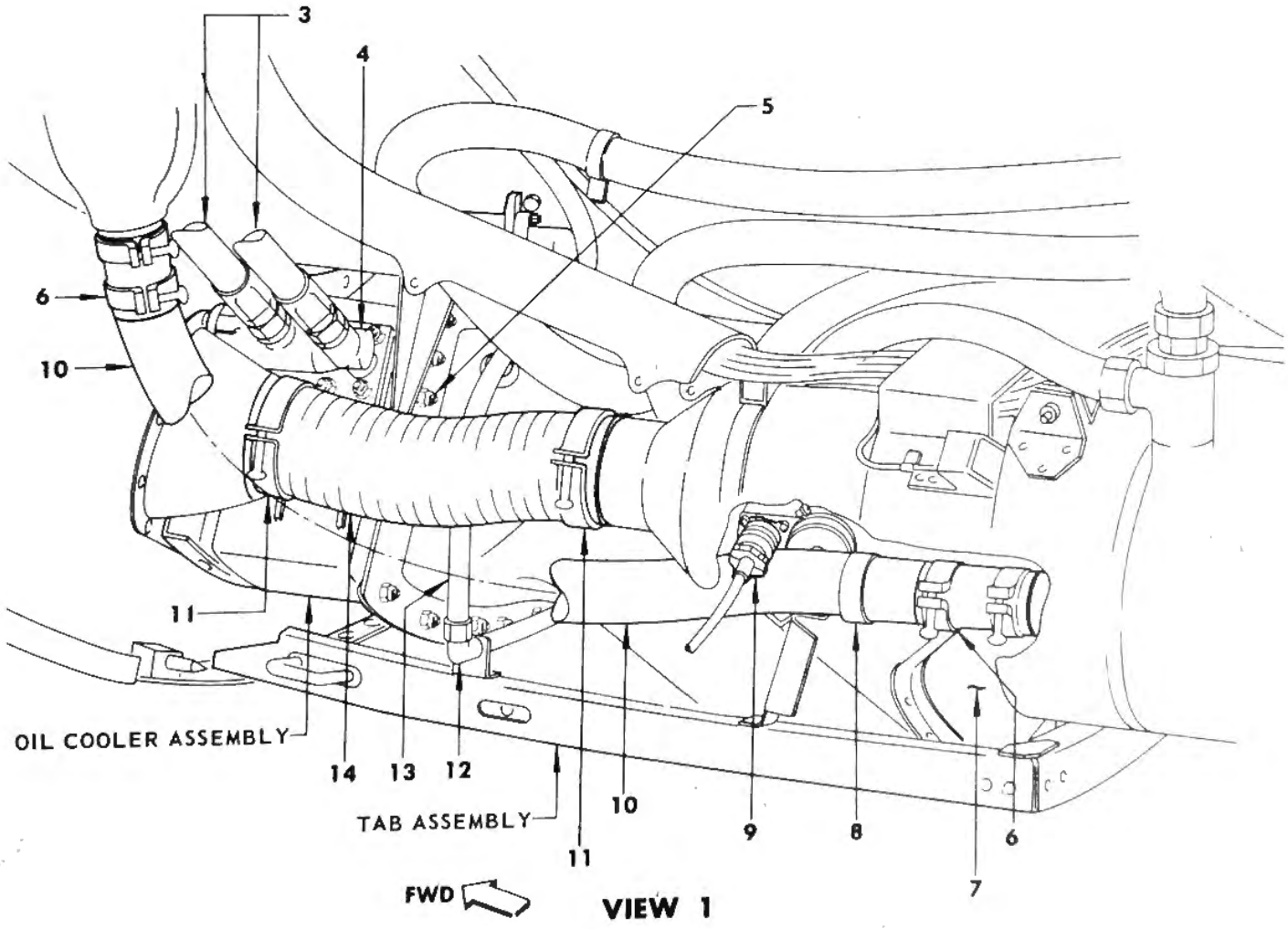
(16) Support tab assembly and remove six mounting bolts (5 and 17).

(17) Rotate aft edge of tab assembly down to clear starter exhaust duct (7) and slide assembly aft then down to clear engine.

(18) Remove fifteen oil cooler assembly mounting bolts (21).

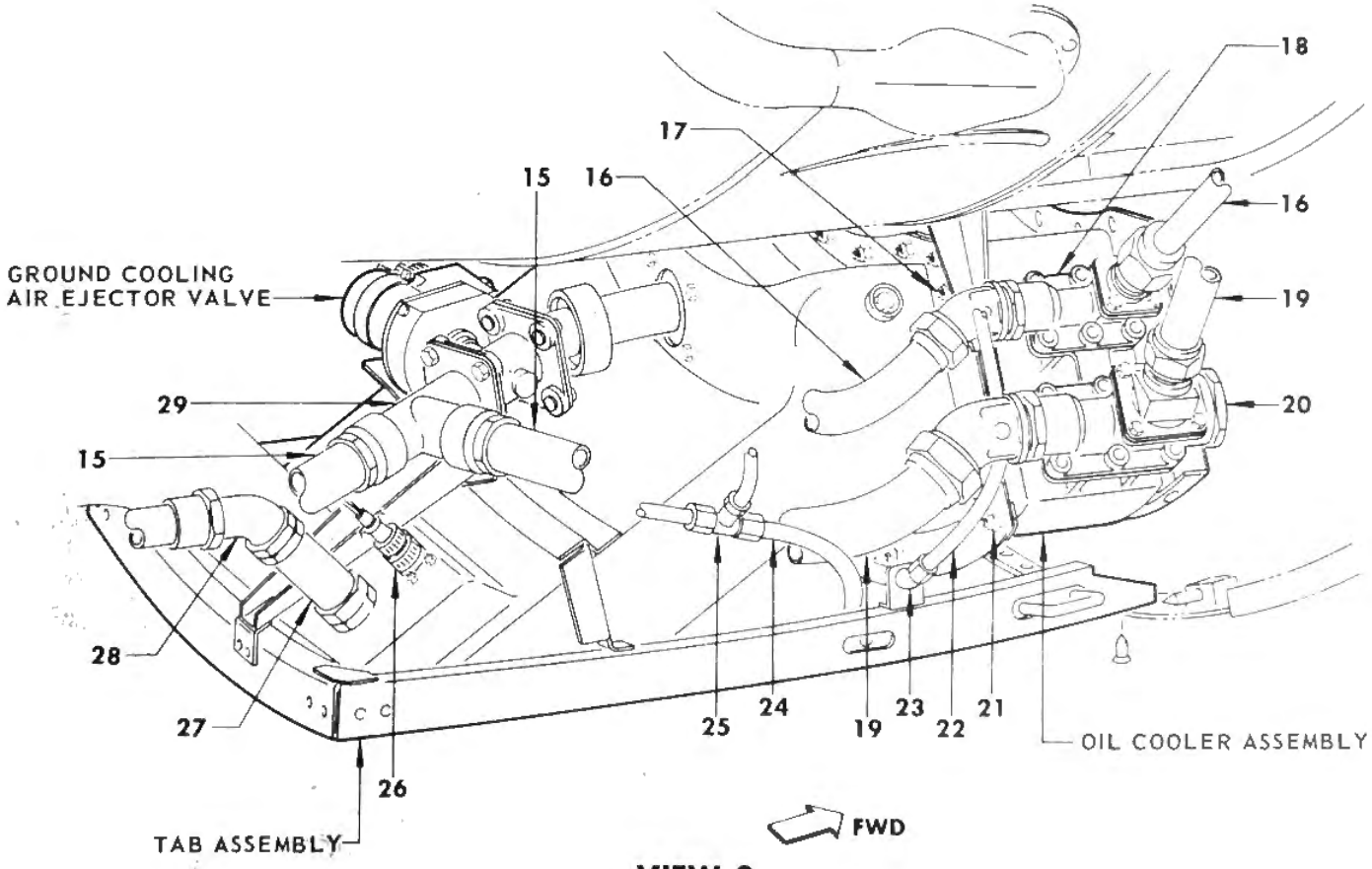


1 TAB ASSEMBLY MOUNTING SCREWS (6 PLACES)
2 INTERPHONE JACK MOUNTING SCREWS (2 PLACES)
3 TURBOCOMPRESSOR OIL LINES
4 TURBOCOMPRESSOR OIL TEMPERATURE REGULATING AND PRESSURE RELIEF VALVE
5 TAB ASSEMBLY MOUNTING BOLTS (LEFT SIDE - 3 PLACES)
6 GENERATOR GROUND COOLING AIR EXHAUST DUCT CLAMP
7 STARTER EXHAUST DUCT
8 GENERATOR GROUND COOLING AIR EXHAUST DUCT SUPPORT BRACKET (2 PLACES)
9 GROUND COOLING AIR EJECTOR VALVE ELECTRICAL PLUG
10 GENERATOR GROUND COOLING AIR EXHAUST DUCT
11 GENERATOR COOLING AIR INLET DUCT CLAMP
12 VENT LINE ELBOW
13 VENT LINE
14 GENERATOR COOLING AIR INLET DUCT



Oil Cooler and Tab Assembly Installation
Figure 201 (Sheet 1 of 2)

15 NOSE COWL ANTI-ICING LINE
16 GENERATOR DRIVE OIL LINE
17 TAB ASSEMBLY MOUNTING BOLTS (RIGHT SIDE - 3 PLACES)
18 GENERATOR DRIVE OIL TEMPERATURE REGULATING AND PRESSURE RELIEF VALVE
19 ENGINE OIL LINE
20 ENGINE OIL TEMPERATURE REGULATING AND PRESSURE RELIEF VALVE
21 OIL COOLER ASSEMBLY MOUNTING BOLTS (15 PLACES)
22 VENT LINE
23 VENT LINE ELBOW
24 DRAIN LINE
25 DRAIN LINE TEE FITTING
26 STARTER HIGH PRESSURE AIR GROUND SERVICE ELECTRICAL PLUG (PAA ONLY)
27 STARTER HIGH PRESSURE AIR GROUND SERVICE CHECK VALVE (PAA ONLY)
28 STARTER HIGH PRESSURE AIR GROUND SERVICE LINE (PAA ONLY)
29 NOSE COWL ANTI-ICING LINE TEE FITTING



VIEW 2

(19) Remove oil cooler assembly from tab assembly.

B. Install Oil Cooler Assembly (See Figure 201.)

(1) Position cooler assembly on tab assembly and install fifteen oil cooler assembly mounting bolts (21).

(2) Lift oil cooler and tab assembly into position on engine.

(3) Install six tab assembly mounting bolts (5 and 17).

(4) Install six tab assembly mounting screws (1).

(5) Connect generator drive oil lines (16) and engine oil lines (19) to generator drive oil temperature regulating and pressure relief valve (18) and engine oil temperature regulating and pressure relief valve (20).

(6) Position interphone jack on tab assembly and install two mounting screws (2).

(7) Connect nose cowl anti-icing lines (15) to tee fitting (29).

(8) On PAA airplanes, connect starter high pressure air ground service electrical plug (26).

(9) On PAA airplanes starter high pressure air ground service line (28) to check valve (27).

(10) Connect vent line (22) to elbow (23) and install support bracket which anchors vent line to oil cooler.

(11) Connect drain line (24) to tee fitting (25).

(12) Connect ground cooling air ejector valve electrical plug (9).

(13) Connect vent line (13) to elbow (12).

(14) Connect turbocompressor oil lines (3) to turbocompressor oil temperature regulating and pressure relief valve (4).

(15) Install generator ground cooling air exhaust duct (10) with clamps (6) and brackets (8).

(16) Install generator cooling air inlet duct (14) with clamps (11).

(17) Close side cowl panels.

(18) Close applicable ground cooling air ejector valve circuit breaker.

END

GROUND COOLING AIR EJECTOR VALVE - MAINTENANCE PRACTICES

1. Removal/Installation Ground Cooling Air Ejector Valve

   A. Remove Ground Cooling Air Ejector Valve

      (1) Open applicable circuit breakers.

      (2) Open left side cowl panel.

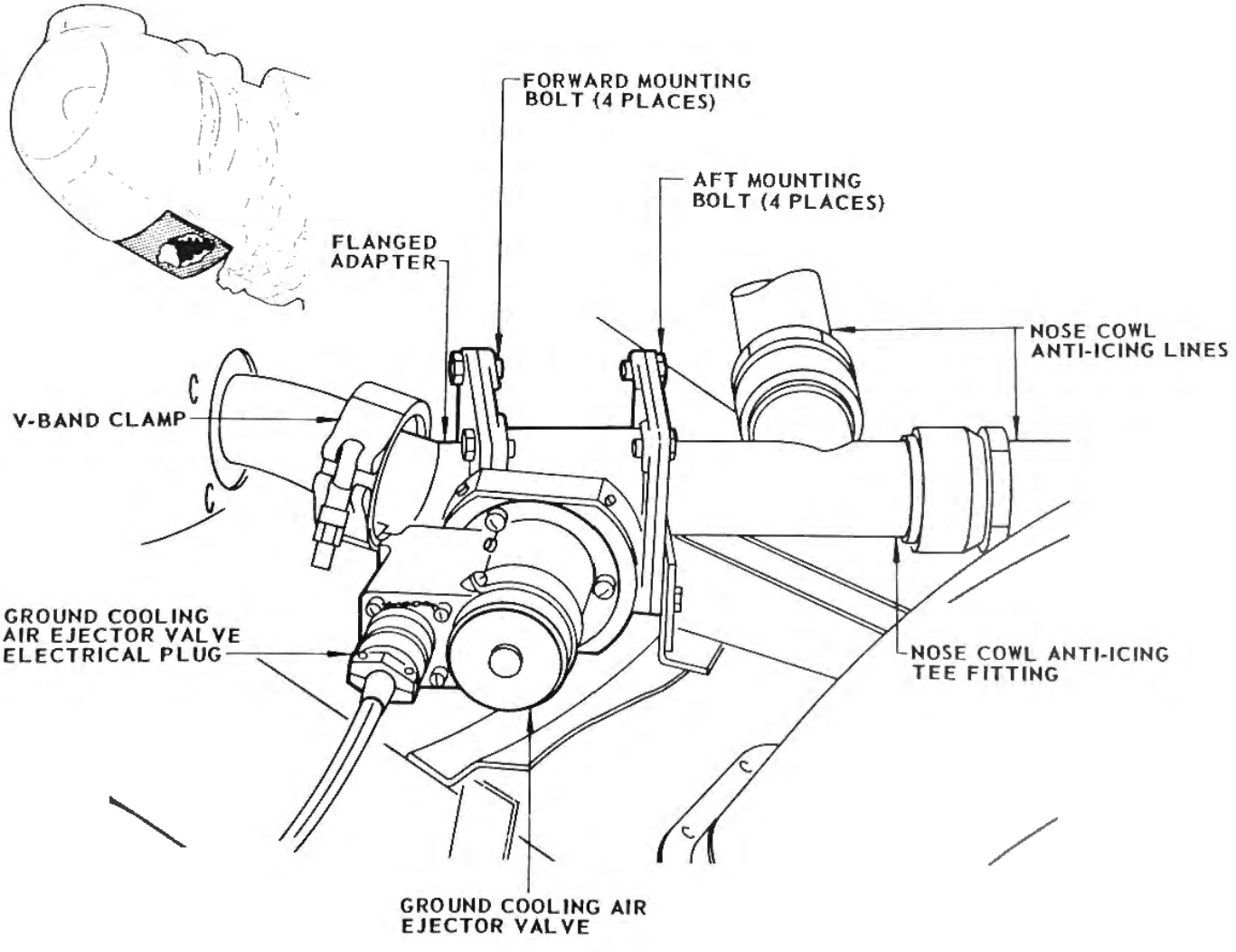
      (3) Remove generator ground cooling exhaust duct by loosening clamps and removing support brackets. (See figure 201, 79-1-31.)

      (4) Disconnect ejector valve electrical plug. (See figure 201.)

      (5) Remove four aft mounting bolts from ejector valve.

      (6) Remove v-band clamp and pull ejector valve free of engine.

      (7) Remove four forward mounting bolts from ejector valve. Save flanged adapter for installation.



Ground Cooling Air Ejector Valve Installation
Figure 201

B. Install Ground Cooling Air Ejector Valve (See figure 201.)

(1) Using a new gasket install flanged adapter with four forward mounting bolts.

(2) Place ejector valve in position on engine with new gaskets at aft mounting flange and at v-band clamp fitting.

(3) Install v-band clamp with a wrenching torque of 80 to 100 pound-inches.

(4) Install four aft mounting bolts.

(5) Connect ejector valve electrical plug.

(6) Install generator ground cooling exhaust duct. (See figure 201, 79-1-31.)

(7) Close left side cowl panel.

(8) Close applicable circuit breakers.

END

OIL QUANTITY INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil quantity indicating system provides indication in the control cabin of usable oil quantity, in gallons, in each engine oil tank. The system consists of four oil quantity indicators and one "PUSH TO TEST GAGES" switch on the flight engineer's lower panel (figure 1), and four oil quantity transmitters, one in each engine oil tank.

B. The system uses capacitance probes as transmitters, and transistorized and miniaturized circuit components in the indicators. This results in a system with few moving parts that is accurate, compact, and light in weight. In addition to the remote indicating system a sight glass is installed in each engine oil tank about five inches below the filler cap.

C. Electrical power for the oil quantity indicating system is 115-volt, 400-cycle ac. The individual circuits for engines 1, 2, 3, and 4 draw power through a-c bus circuit breaker panels P1, P2, P3, and P4 respectively.

2. Oil Quantity Transmitter

A. The oil quantity transmitter (figure 2), is a capacitance probe type compensator tank unit. It is composed of two distinct capacitors: the tank unit and the compensator.

B. The tank unit portion of the transmitter is a variable electrostatic capacitor consisting of two concentric electrodes rigidly spaced and insulated from each other by plastic centering spacers. The inner electrode is a plastic tube with two separate metallic areas attached to its surface. One area is active and is connected to the amplifier input in the system circuit. The other area is grounded to prevent fringing of the active area. The outer electrode is an aluminum tube with an insulating finish on its outer surface.

C. The compensator portion of the transmitter is a group of concentric aluminum tubes spaced and insulated from each other by plastic spacers. Since the compensator is attached to the lower end of the tank unit it will be submerged even when the oil tank is nearly empty.

D. Openings at each end of the tank unit permit oil to flow between the electrodes to the same level as that in the oil tank. The oil between the electrodes provides the dielectric which is the variable factor of the capacitor. The purpose of the compensator is to minimize the effect of changes in the dielectric constant of the oil due to variations in temperature or in oil properties.

E. The oil quantity transmitters are mounted in fittings welded into the bottom of each engine oil tank (figure 1).

3. Oil Quantity Indicator

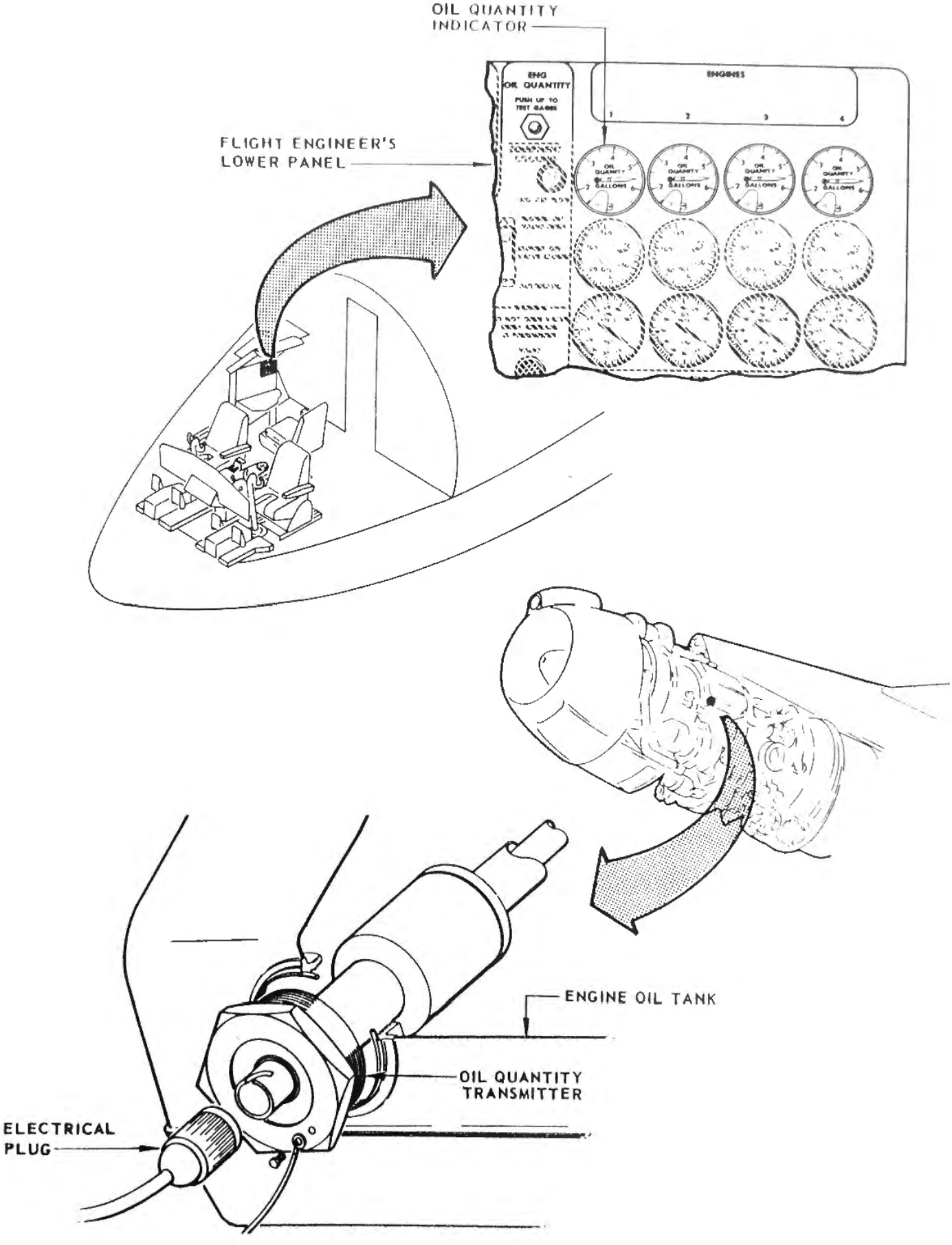
A. The oil quantity indicator (figure 2), actually contains two separate units: the indicator unit and the power unit. The indicator unit consists of a reversible single phase induction motor driving an electrically linear rebalance potentiometer and a dial assembly through an appropriate gear train. The power unit includes: a capacitance bridge network, a three stage transistorized amplifier, a rectifier to provide d-c power for the transistors, and suitable transformers. The complete indicator assembly is hermetically sealed.

B. The oil quantity indicators, one for each engine, are located in a horizontal row on the right-hand portion of the flight engineer's lower panel (figure 1). The indicators are secured to the panel by a standard clamp mounting arrangement and may be removed from the front of the panel.

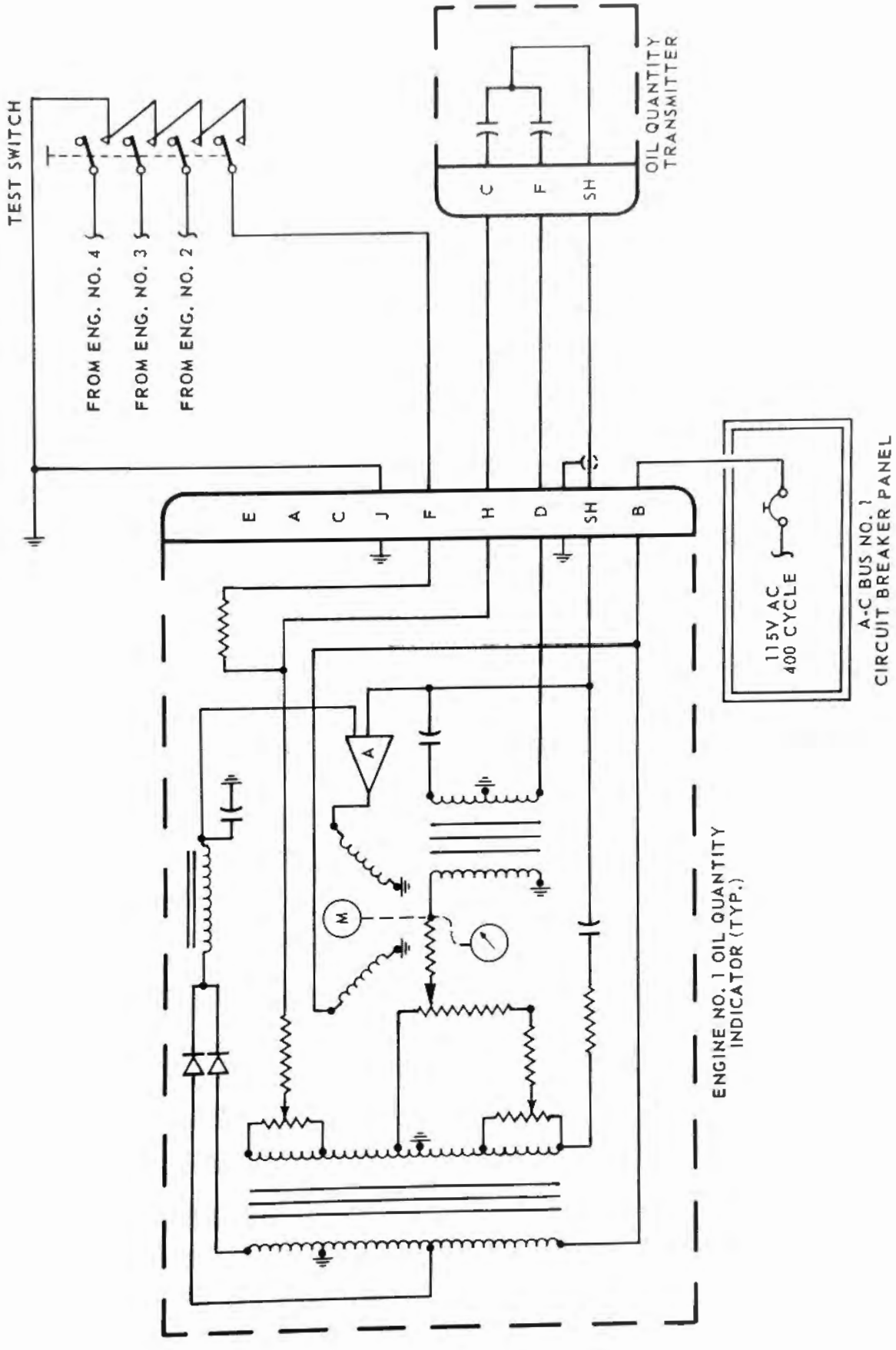
4. Operation

A. The oil level in the engine oil tank determines the capacitance of the oil quantity transmitter. This capacitance is a part of the self-balancing capacitance bridge network in the indicator. When balanced, this bridge network indicates gallons of oil on the indicator dial. (See figure 2.)

B. Closing the "PUSH TO TEST GAGES" switch reduces the voltage on the transmitter side of the bridge (figure 2). As a result, all the indicators drive toward the empty end of the dial. If the system is functioning properly the indicators will return to their original position when the test switch is released.

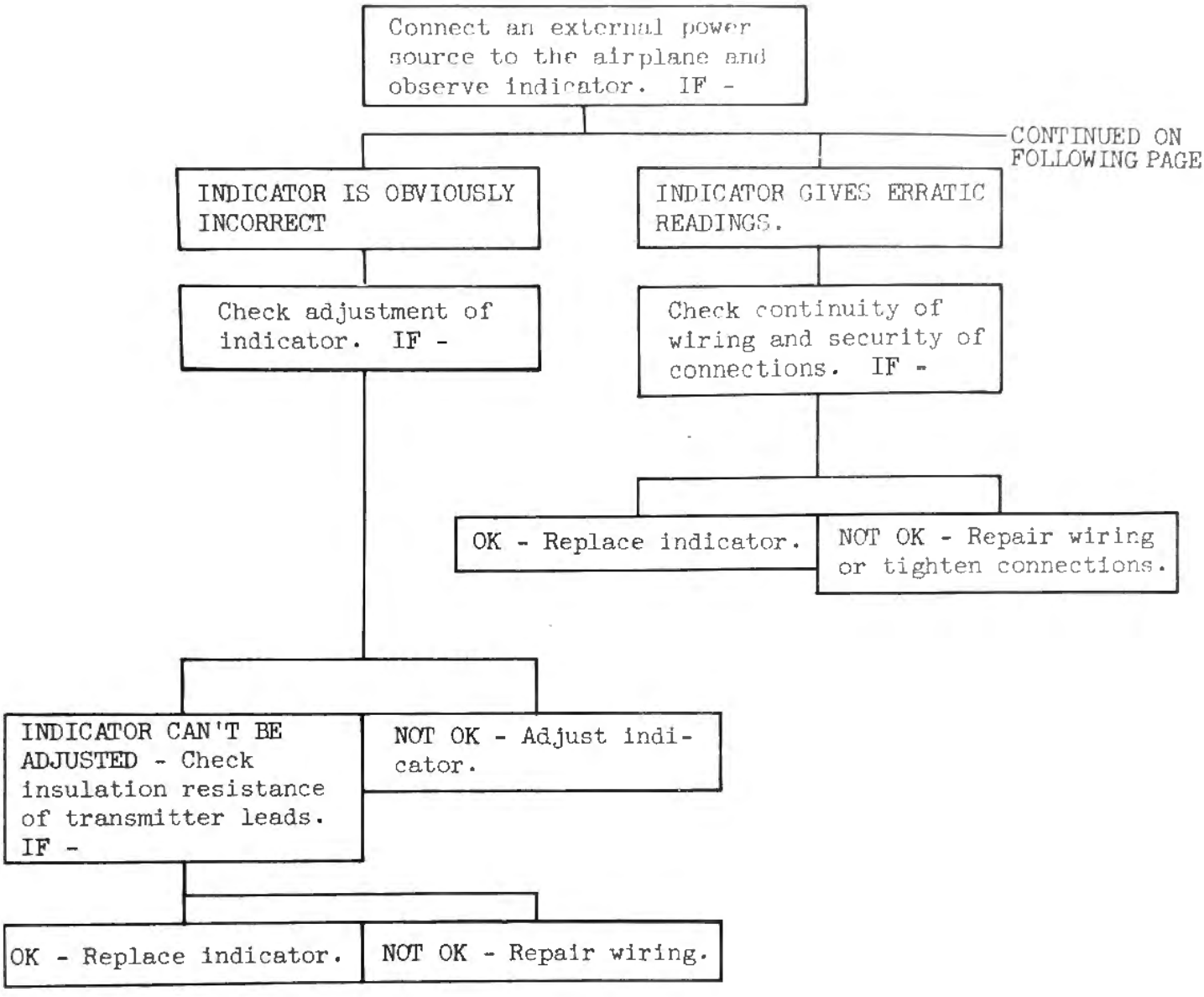


Oil Quantity Indicating System Component Location
Figure 1



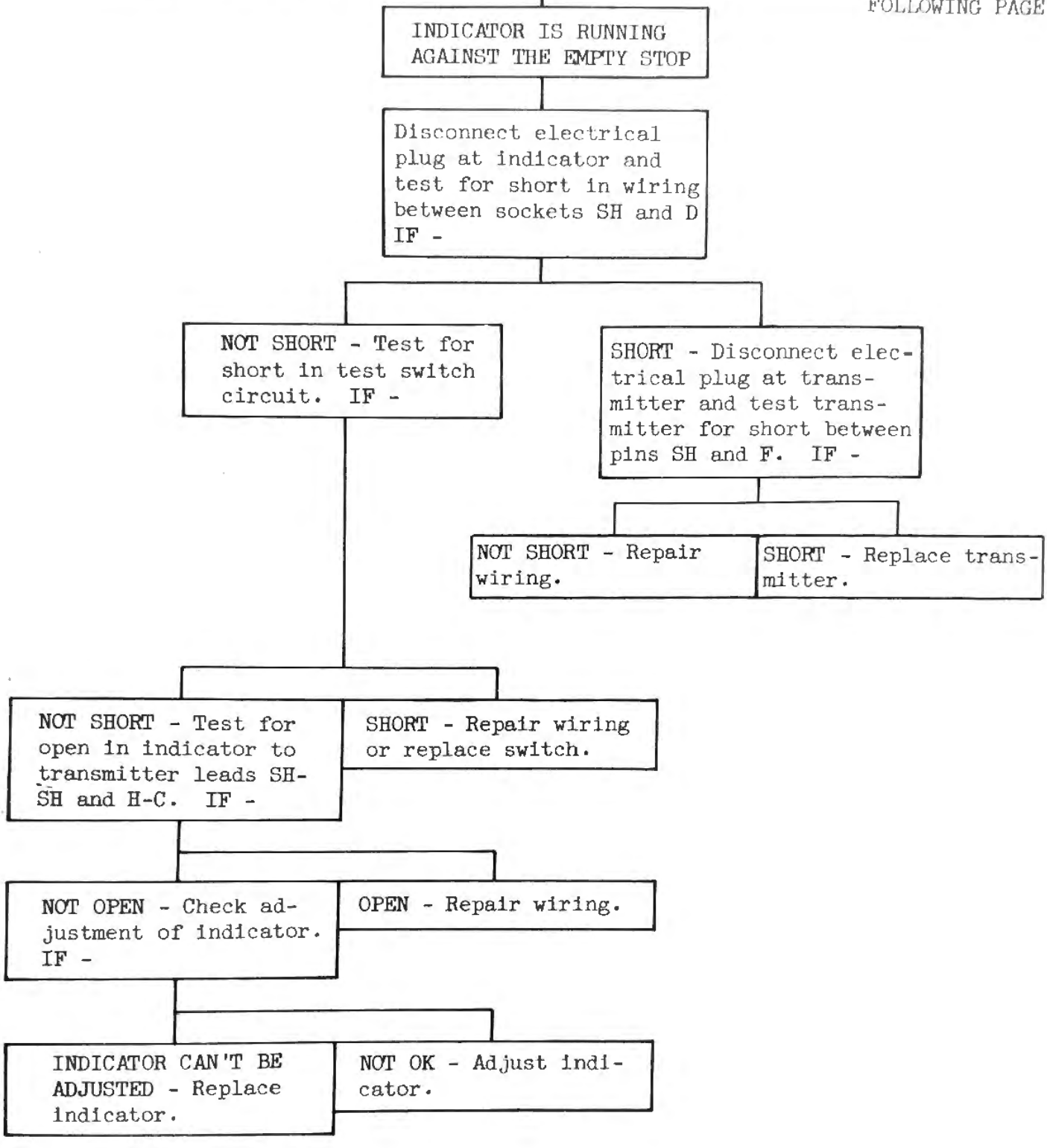
Oil Quantity Indicating System Schematic
Figure 2

OIL QUANTITY INDICATING SYSTEM - TROUBLE SHOOTING



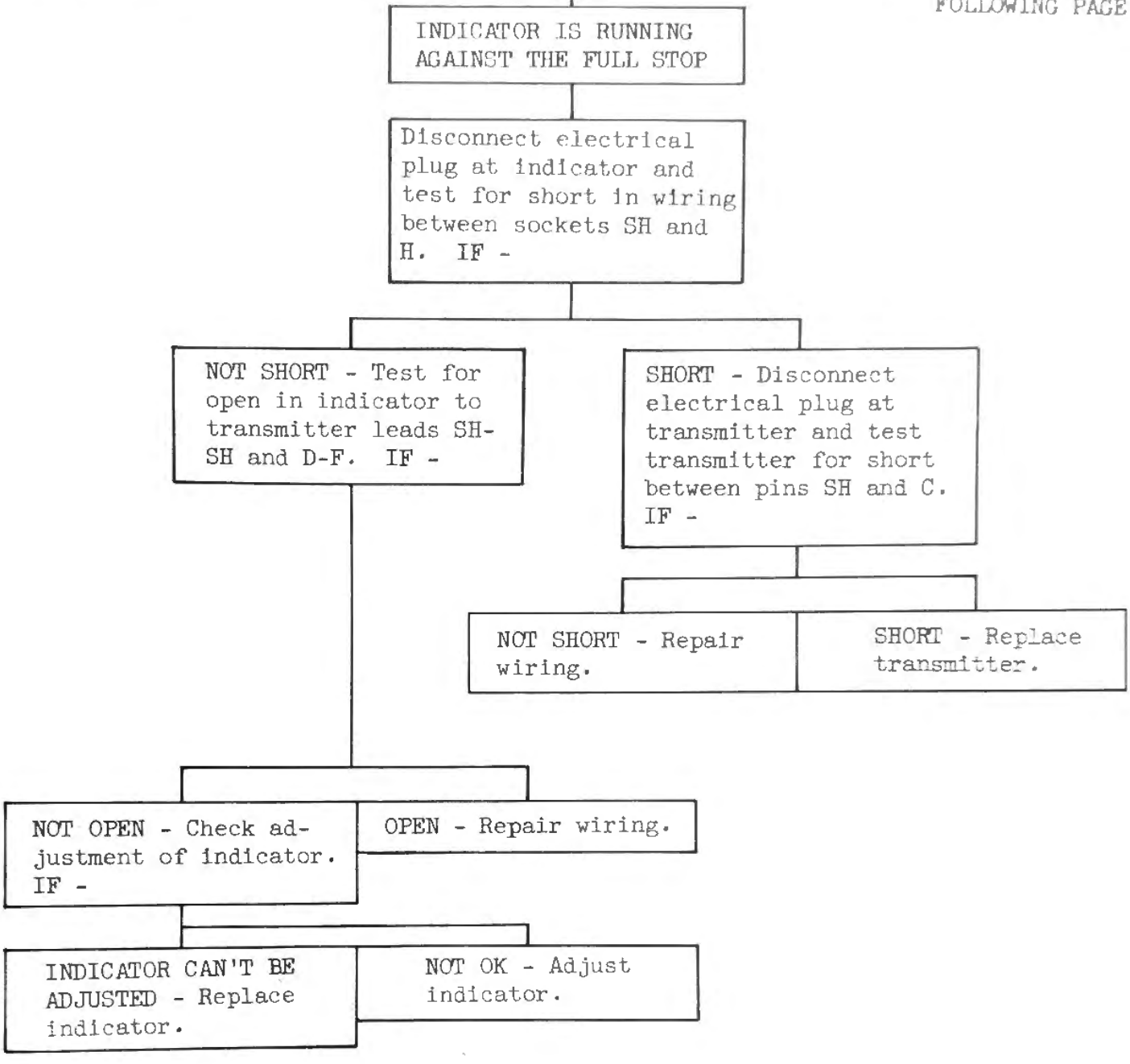
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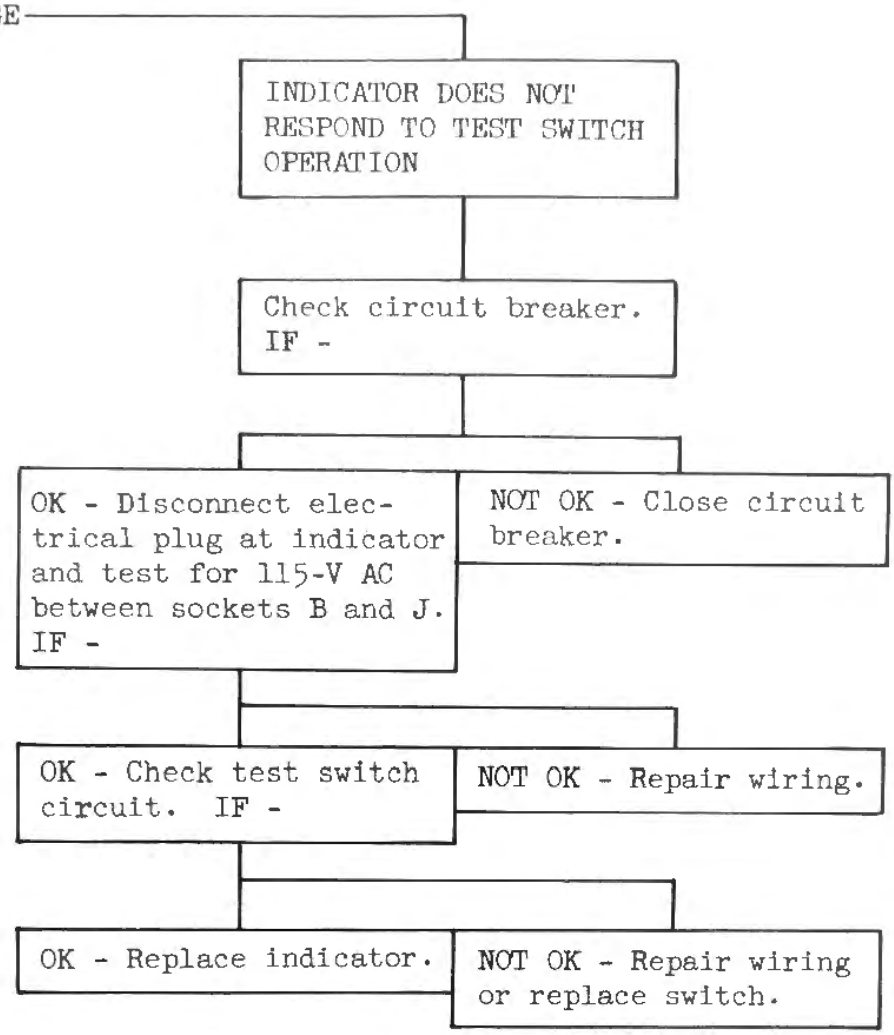


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END

OIL QUANTITY INDICATING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Quantity Indicating System

A. Equipment and Materials

(1) Variable capacitance tester - Type MD-1, or equivalent, with adapter harness kit and calibration correction chart - General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts.

B. Prior to adjusting the oil quantity indicating system the engine oil tank shall be filled, allowed to stand for 5 minutes and then drained.

C. Adjust Oil Quantity Indicating System

(1) Connect external power and determine that the respective oil quantity indicating system circuit breaker on a-c bus circuit breaker panel P1, P2, P3, or P4 is closed.

(2) Drain tank completely, close drain connection, then add 5 U.S. quarts (1.25 U.S. gallons) of oil to tank.

(3) At the back of the oil quantity indicator, located on flight engineer's lower panel, adjust "EMPTY" screw until the indicator pointer shows at small sight hole on lower end of dial scale.

NOTE: Push the "TEST SWITCH" after each small increment of adjustment is made.

(4) Connect MD-1 tester and harness (UG292E-1) into oil quantity indicator circuit per figure 201.

(5) Adjust the C1 capacitor of the MD-1 tester until the same gage showing as step (3) is obtained, then increase setting of tester by 1 uuf. Lock tester at this reading.

(6) Reset the "EMPTY" adjusting screw on the back of the oil quantity indicator until the pointer again appears at the sight hole in the dial mask.

(7) Remove the harness and tester and reconnect the tank unit electrical plug.

(8) Fill the tank by adding 4.85 U.S. gallons to the quantity shown in step (2) making a total of 6.1 U.S. gallons.

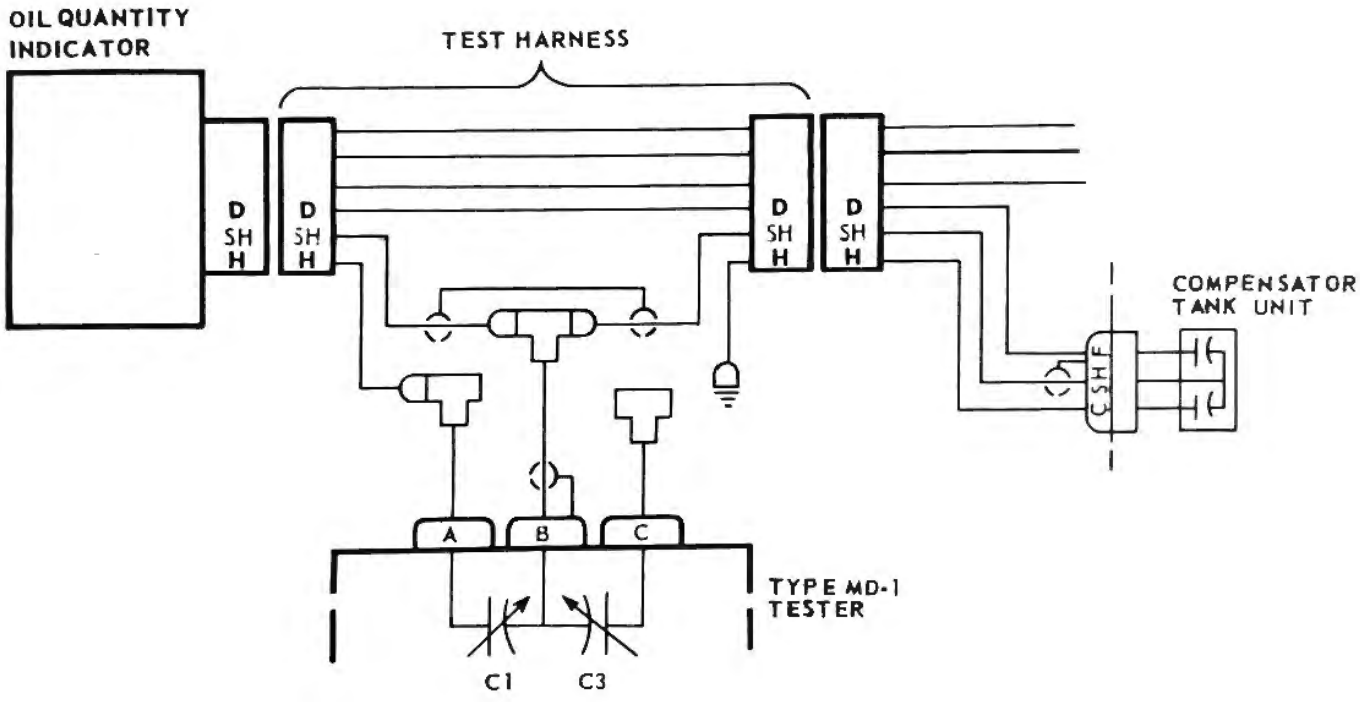
(9) Set the "FULL" adjusting screw on the back of the oil quantity indicator until gage reads 5.5 U.S. gallons.

(10) Repeat step (4) above with setting obtained in step (5).

(11) Check the zero reading of step (3). Re-adjust if necessary.

(12) Disconnect tester, reconnect tank unit and observe gage reading. Readjust as step (9) if necessary.

(13) Repeat steps (10) through (12) until zero and full adjustments are established within 0.1 U.S. gallons.



Oil Quantity Indicating System Test Circuit Configuration
Figure 201

END

OIL QUANTITY INDICATING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Quantity Indicating System

A. Equipment and Materials

(1) Variable capacitance tester - Type MD-1, or equivalent, with adapter harness kit and calibration correction chart - General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts.

B. Prior to adjusting the oil quantity indicating system the engine oil tank shall be filled, allowed to stand for 5 minutes and then drained.

C. Adjust Oil Quantity Indicating System

(1) Connect external power and determine that the respective oil quantity indicating system circuit breaker on a-c bus circuit breaker panel P1, P2, P3, or P4 is closed.

(2) Drain tank completely, close drain connection, then add 5 U.S. quarts (1.25 U.S. gallons) of oil to tank.

(3) At the back of the oil quantity indicator, located on flight engineer's lower panel, adjust "EMPTY" screw until the indicator pointer shows at small sight hole on lower end of dial scale.

NOTE: Push the "TEST SWITCH" after each small increment of adjustment is made.

(4) Connect MD-1 tester and harness (UG292E-1) into oil quantity indicator circuit per figure 201.

(5) Adjust the C1 capacitor of the MD-1 tester until indicator shows at small right hole on lower end of dial scale then increase setting of tester by 1 uuf. Lock MD-1 tester adjustment at this setting.

(6) Reset the "EMPTY" adjusting screw on the back of the oil quantity indicator until the pointer again appears at the sight hole in the dial scale.

(7) Remove the harness and tester and reconnect the system wiring to indicator.

(8) Add 4.85 gallons of oil into tank to make a total of 6.1 gallons.

(9) Set the "FULL" adjusting screw on the back of the oil quantity indicator until gage reads 5.5 U.S. gallons. Push "PRESS-TO-TEST" switch several times while making adjustment.

(10) Reconnect MD-1 tester and harness into oil quantity indicator circuit as figure 201.

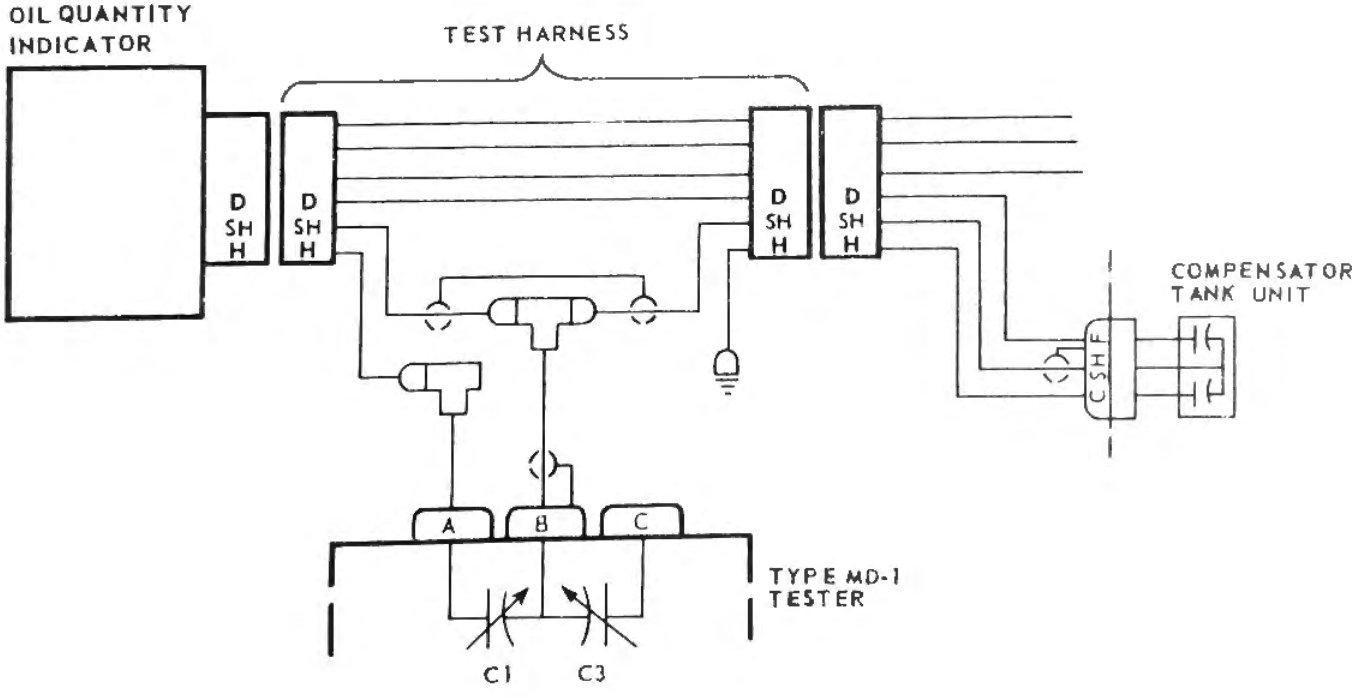
NOTE: MD-1 reading is not changed from setting as in step (5).

(11) Check that indicator pointer again shows at small sight hole in dial scale. Readjust indicator "EMPTY" screw if necessary to obtain this indication.

(12) Disconnect MD-1 tester and harness, reconnect system wiring to indicator and observe if gage reads 5.5 U.S. gallons. Readjust "FULL" screw if necessary to obtain this indication.

(13) Repeat steps (10) through (13) until zero and full adjustments are established within 0.1 U.S. gallons.

NOTE: Since there is interaction between "EMPTY" and "FULL" adjustment screws it is necessary to repeat the adjustments until their effect on each other is at the acceptable minimum.



Oil Quantity Indicating System Test Circuit Configuration
Figure 201

OIL QUANTITY TRANSMITTER - MAINTENANCE PRACTICES

1. Removal/Installation Oil Quantity Transmitter

A. Remove Oil Quantity Transmitter (See figure 201.)

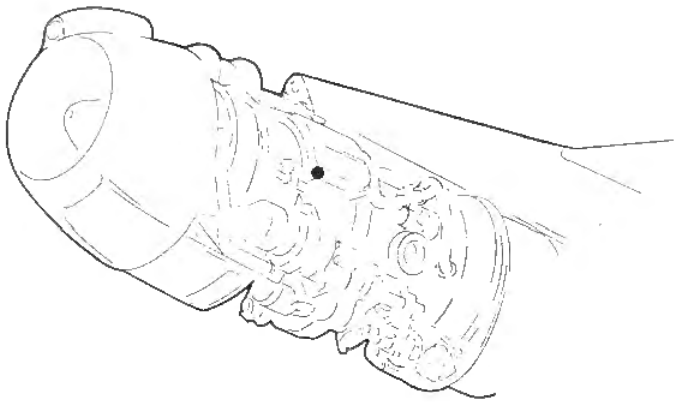
(1) Drain engine oil tank.

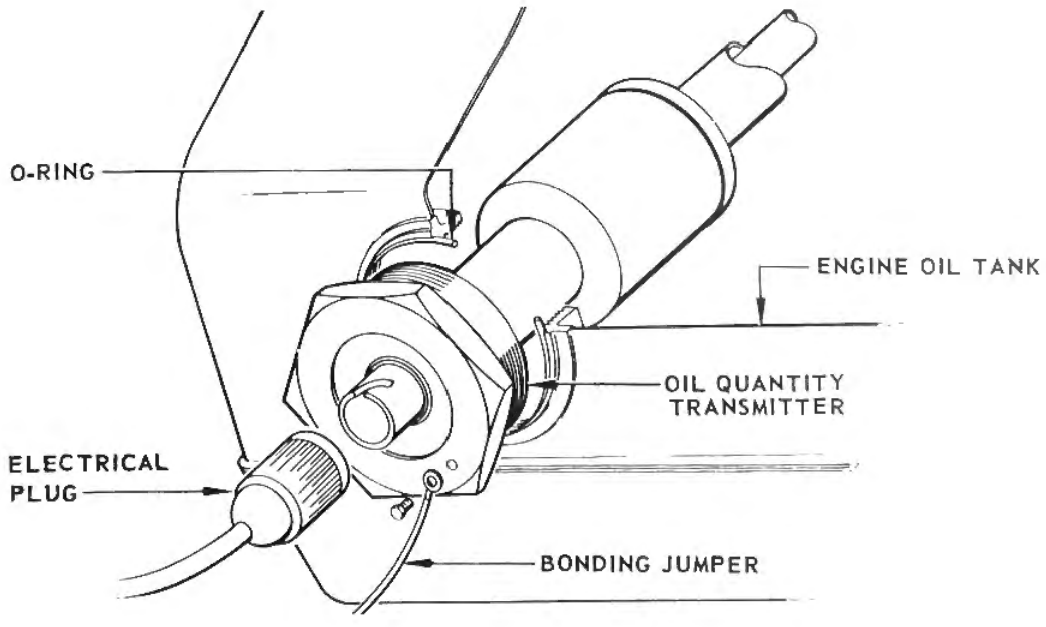
(2) Open respective oil quantity circuit breaker on a-c bus circuit breaker panel P1, P2, P3, or P4.

(3) Remove electrical plug.

(4) Remove bonding jumper.

(5) Unscrew oil quantity transmitter and remove transmitter and O-ring from engine oil tank.





Oil Quantity Transmitter Installation
Figure 201

B. Install Oil Quantity Transmitter (See figure 201.)

(1) With a new O-ring in place install oil quantity transmitter with a wrenching torque of 700 to 900 pound-inches.

(2) Install safety wire.

(3) Install bonding jumper

(4) Connect electrical plug.

(5) Adjust oil quantity indicating system. See 79-2-0.

END

OIL PRESSURE INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil pressure indicating system provides visual indication in the control cabin of oil pressure at each engine. The system consists of four oil pressure transmitters, one at each engine, and four oil pressure indicators on the flight engineer's lower panel. (See figure 1.)

B. The oil pressure transmitter senses the differential between engine oil pressure and engine vent pressure. The resultant pressure is electrically transmitted to the oil pressure indicator and visually duplicated by the indicator on the flight engineer's lower panel.

2. Oil Pressure Transmitter

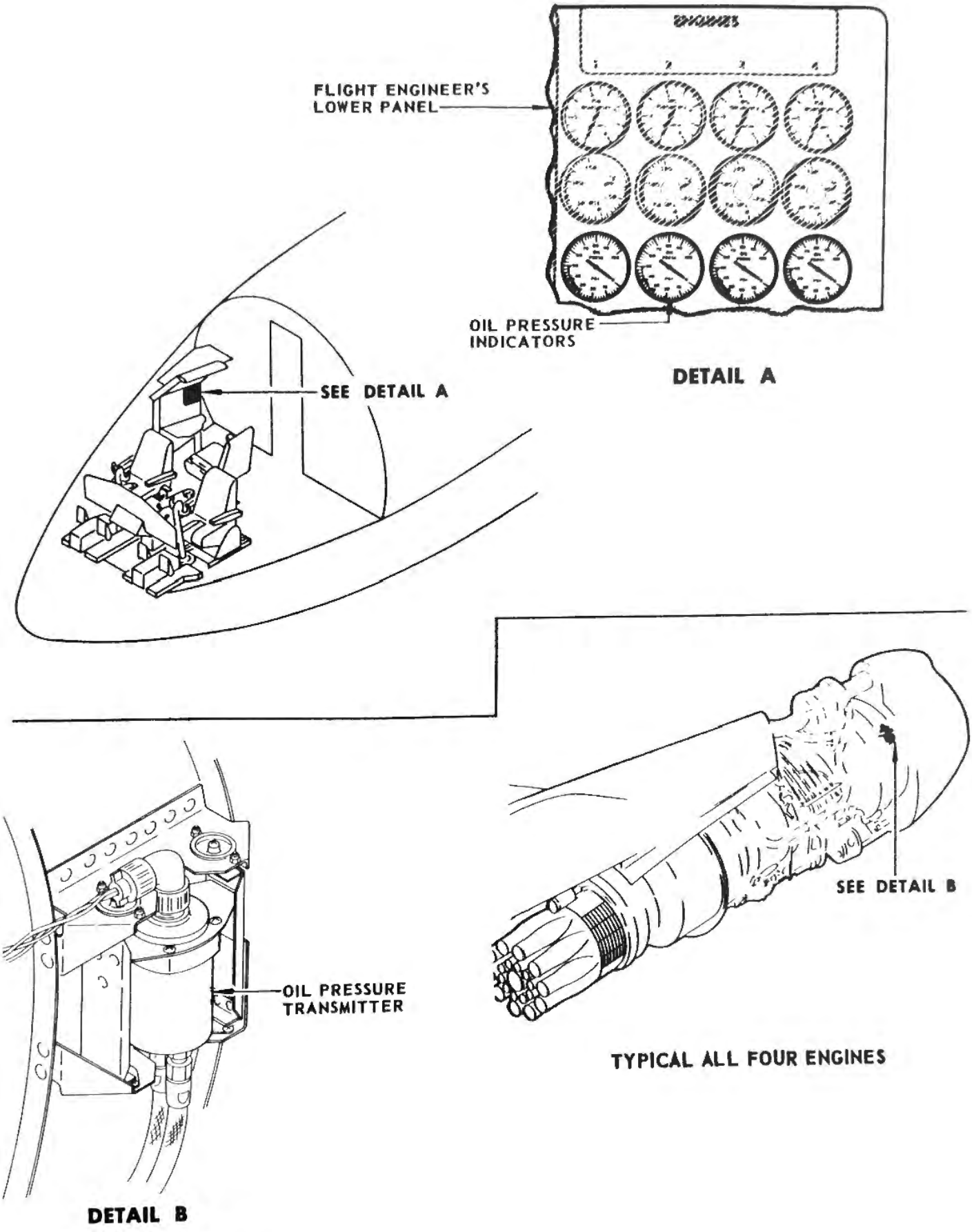
A. The oil pressure transmitter changes engine oil pressure into an electrical signal which is sent to the oil pressure indicator. The transmitter consists of two opposing bourdon tubes, a gear train or amplifying movement and a synchro motor. The transmitter, located on the right side of the engine, is attached to a bracket on the nose cowl mounting flange. (See figure 1.) Tubes from the engine pressure oil line and the engine breather chamber are connected respectively to the pressure (P) port and the vent (V) port on the transmitter.

B. The resultant motion of the two bourdon tubes is transmitted through the amplifying movement to the rotor shaft of the synchro motor. The position of the rotor shaft produces an electrical signal which is sent to the respective oil pressure indicator in the control cabin. (See figure 2.)

3. Oil Pressure Indicator

A. The oil pressure indicator changes the electrical signal from the oil pressure transmitter into a visual reading on the dial face of the indicator. The indicator consists of a synchro motor with a pointer attached to its rotor shaft and a dial face. The dial face is graduated from 0 to 100 psi over an arc of 320°.

B. Four oil pressure indicators, one for each engine, are mounted in a horizontal row on the aft portion of the flight engineer's lower panel. (See figure 1.) The indicators are secured to the panel by a standard clamp mounting arrangement and may be removed from the front of the panel.



Oil Pressure Indicating System Component Location
Figure 1

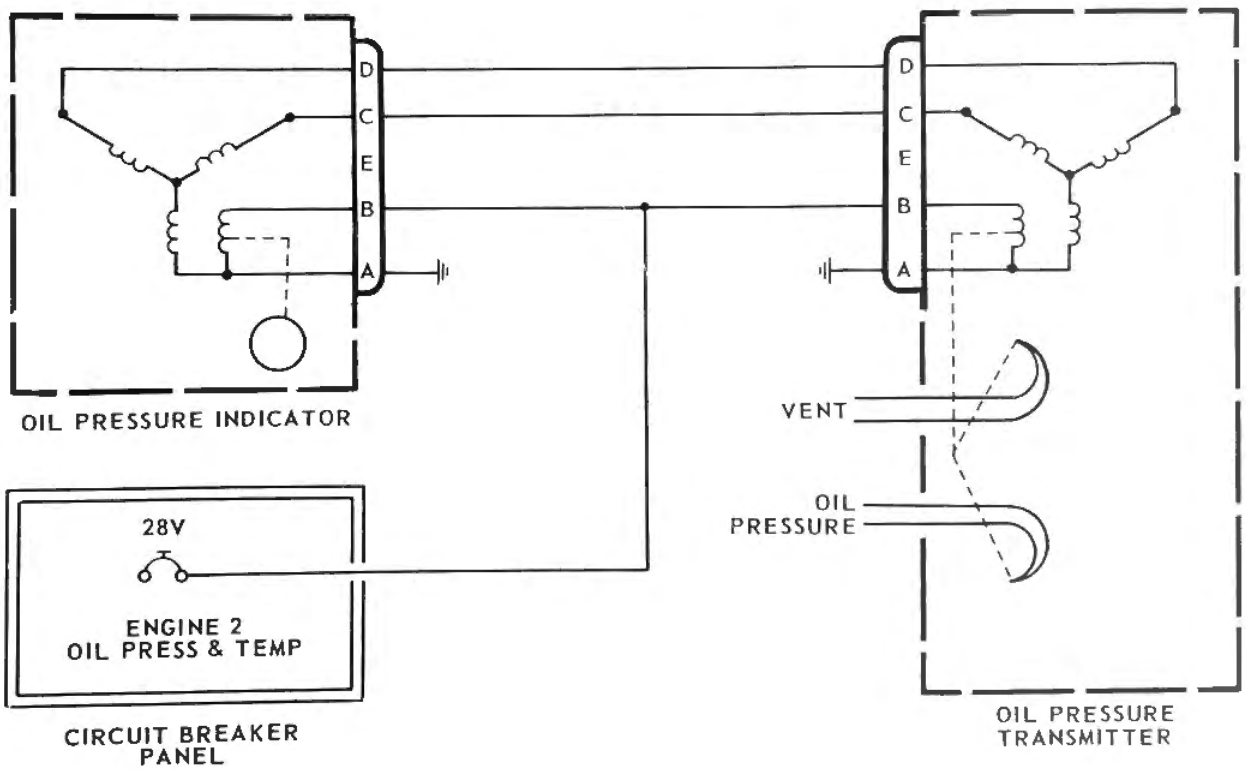
4. Operation

A. Electrically, the rotor shafts of the transmitter and indicator motors are locked together. (See figure 2.) Therefore, the position the transmitter rotor assumes is duplicated by the indicator rotor. Since the indicator pointer is mounted on the rotor shaft of the indicator motor it will indicate the position of the rotor and hence the engine oil pressure.

B. Electrical power for the oil pressure indicating system is 28 volt, 400-cycle ac. With power applied to the system the oil pressure indicator will continuously indicate existing engine oil pressure. If power is interrupted the indicator pointer will remain at the oil pressure existing when power was last available.

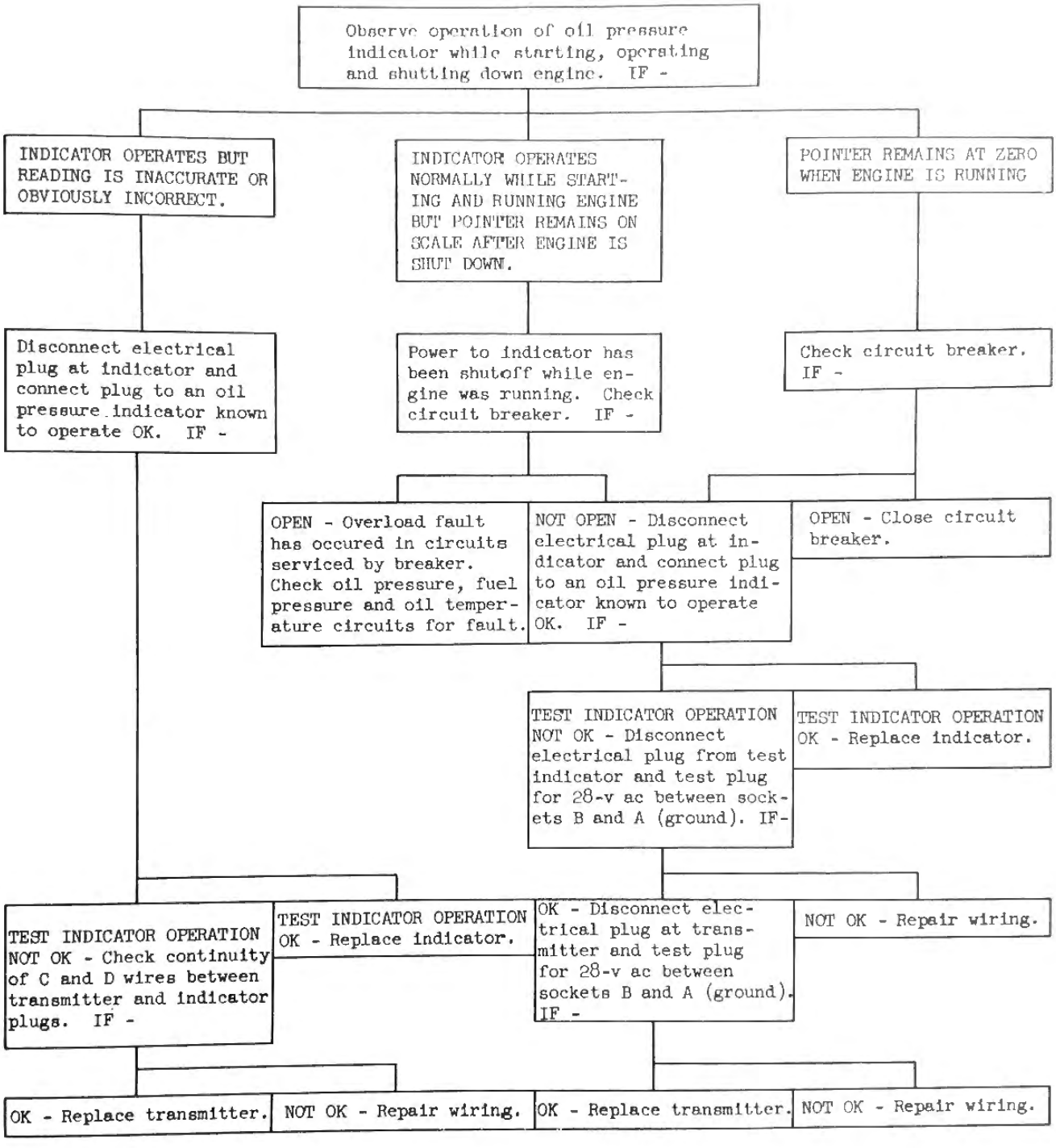
C. Circuit breakers are located as follows:

Engine No. 1 - 28-Volt A-C Circuit Breaker Panel (P7)
Engine No. 2 - A-C Bus No. 2 Circuit Breaker Panel (P2)
Engine No. 3 - A-C Bus No. 3 Circuit Breaker Panel (P3)
Engine No. 4 - A-C Bus No. 4 Circuit Breaker Panel (P4)



Oil Pressure Indicating System Circuit
Figure 2

OIL PRESSURE INDICATING SYSTEM - TROUBLE SHOOTING



OIL PRESSURE INDICATING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Pressure Indicating System

A. Equipment and Materials

(1) Air pressure source, adjustable 0 to 100 psi.

B. Test Oil Pressure Indicating System

(1) Connect external power to the airplane and determine that applicable oil pressure indicating system circuit breaker is closed.

(2) Open right engine side cowl.

(3) Disconnect oil pressure line at tee fitting (figure 201) and connect adjustable air pressure source to the disconnected line.

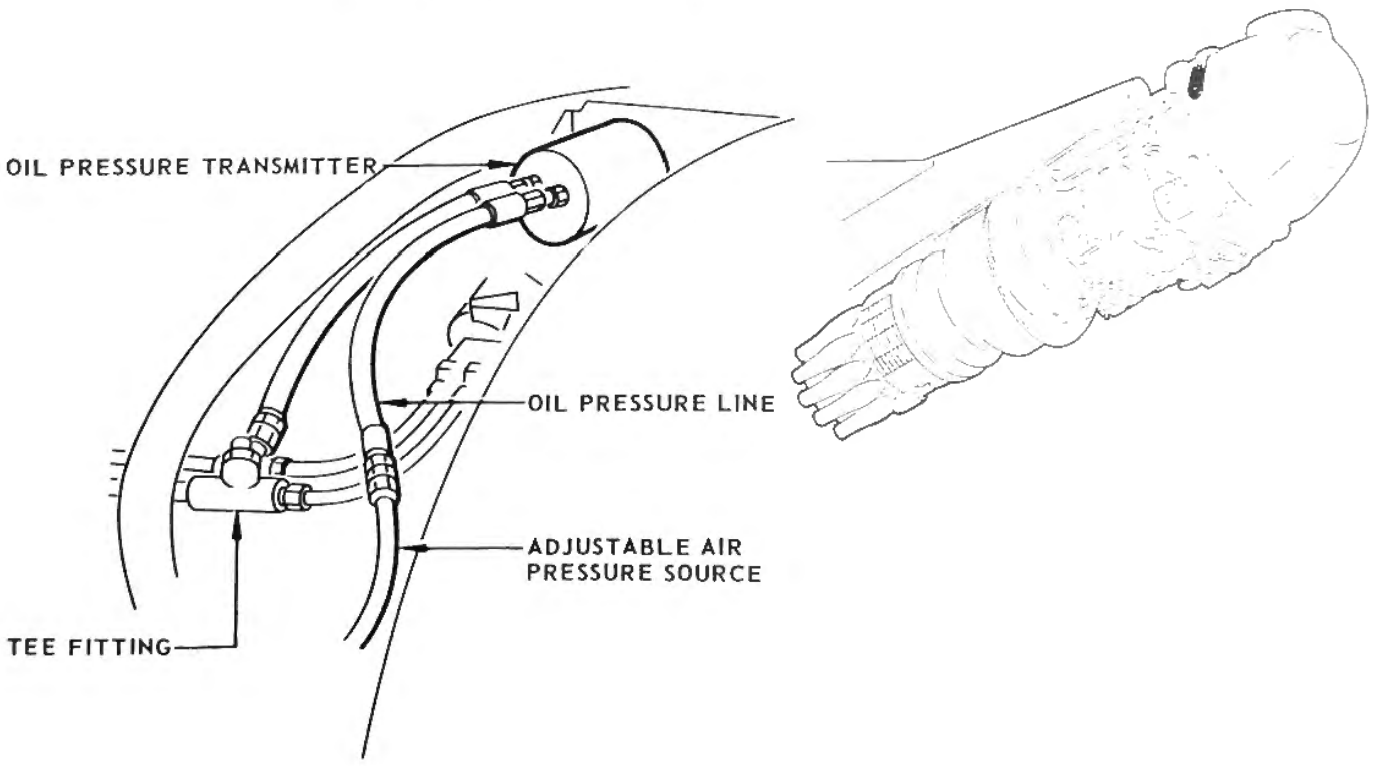
(4) Apply air pressure of 100 psig and observe reading of corresponding oil pressure indicator. Indicator should read 100 ± 3 psig.

(5) Hold pressure for 3 minutes. There should be no leakage.

(6) Adjust air pressure to 50 psig. Indicator should read 50 ± 3 psig.

(7) Remove adjustable air pressure source. Indicator should read zero.

(8) Reconnect oil pressure line to tee fitting, close right engine side cowl and remove external power.



Oil Pressure Indicating System Test Connection
Figure 201

OIL PRESSURE TRANSMITTER - MAINTENANCE PRACTICES

1. Removal/Installation Oil Pressure Transmitter

A. Remove Oil Pressure Transmitter (See Figure 201.)

(1) Open applicable oil pressure indicating system circuit breaker.

(2) Open right engine side cowl.

(3) Disconnect electrical plug.

(4) Disconnect vent line and oil pressure line from unions on oil pressure transmitter.

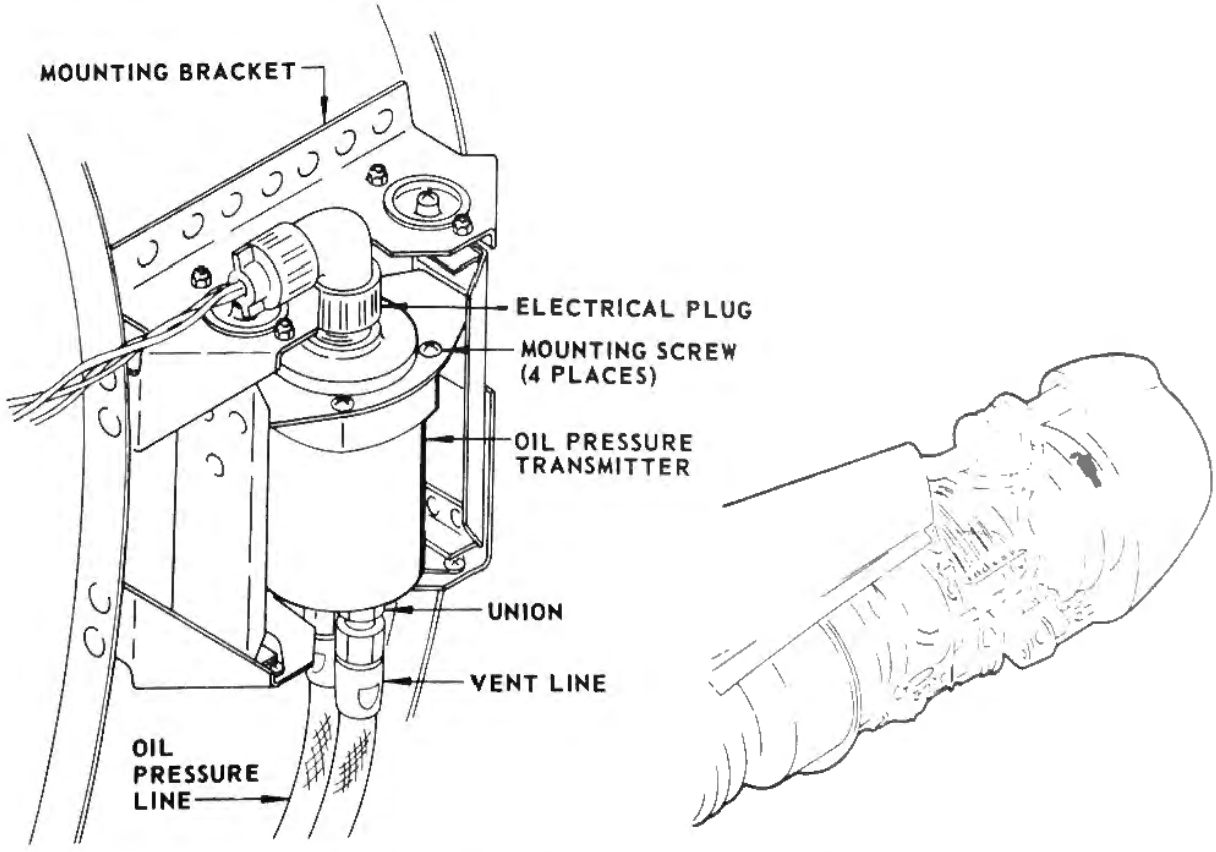
(5) Support transmitter and remove four mounting screws securing transmitter to mounting bracket.

(6) Remove transmitter from bracket.

(7) If transmitter is to be replaced with a new unit remove unions and O-rings.

B. Install Oil Pressure Transmitter (See Figure 201.)

(1) If a new oil pressure transmitter is being installed, install unions with new O-rings.



Oil Pressure Transmitter Installation
Figure 201

(2) Place transmitter in mounting bracket so that "P" port is toward engine and "V" port is away from engine.

(3) Install four mounting screws securing transmitter to mounting bracket.

(4) Connect vent line to "V" port and pressure line to "P" port.

(5) Connect electrical plug.

(6) Close right engine side cowl.

(7) Close applicable oil pressure indicating system circuit breaker.

END

OIL TEMPERATURE INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil temperature indicating system provides visual indication in the control cabin of oil inlet temperature at each engine. The system consists of four oil temperature indicators on the flight engineer's lower panel and four temperature bulbs, one at each engine. (See figure 1.)

B. The oil temperature bulb senses the temperature of the oil at the engine inlet fitting. This temperature is electrically transmitted to the oil temperature indicator and visually duplicated by the indicator on the flight engineer's lower panel.

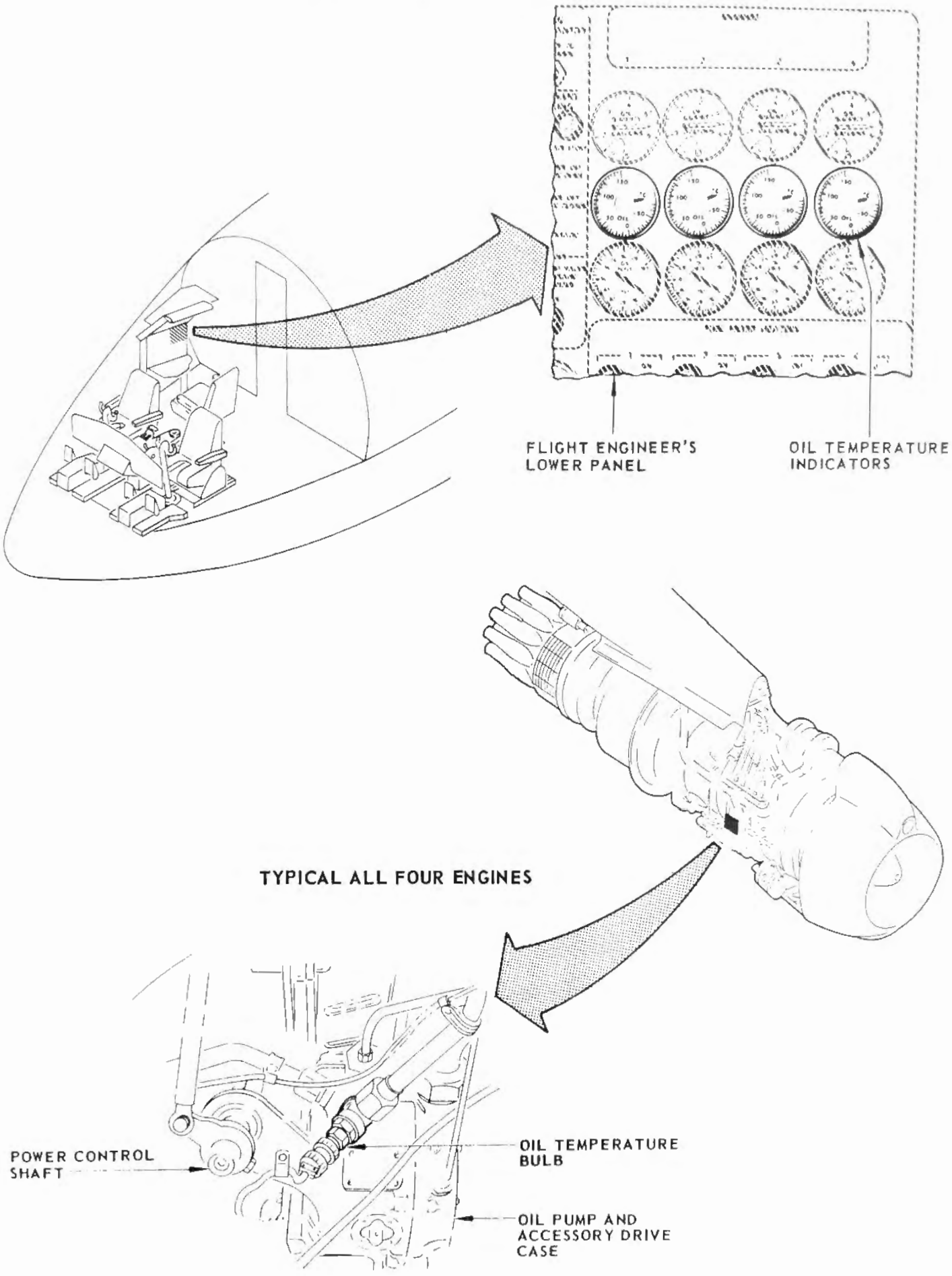
2. Oil Temperature Bulb

A. The oil temperature bulb changes engine oil temperature into an electrical signal which is sent to the oil temperature indicator. The bulb is a sealed unit containing a temperature-sensitive resistor. The bulb is mounted in a "Y" fitting in the engine oil in line (figure 1). The oil temperature controls the resistance of the bulb which, in turn, controls the electrical signal sent by the bulb to the oil temperature indicator.

3. Oil Temperature Indicator

A. The oil temperature indicator changes the electrical signal from the oil temperature bulb into a visual reading on the dial face of the indicator. The indicator consists of a rectifier, a self balancing resistance bridge with a pointer attached to the pivot shaft of the balancing movement and a dial face. The dial face is graduated from -70°C to + 150°C over an arc of 250 degrees. The four indicators, one for each engine, are located in a horizontal row on the aft portion of the flight engineer's lower panel. (See figure 1.) The indicators are secured to the panel by a standard clamp mounting arrangement and may be removed from the front of the panel.

B. The balancing movement positions itself so as to counteract the electrical signal from the oil temperature bulb. The indicator pointer shows the position of the balancing movement in the form of a temperature reading on the dial face.



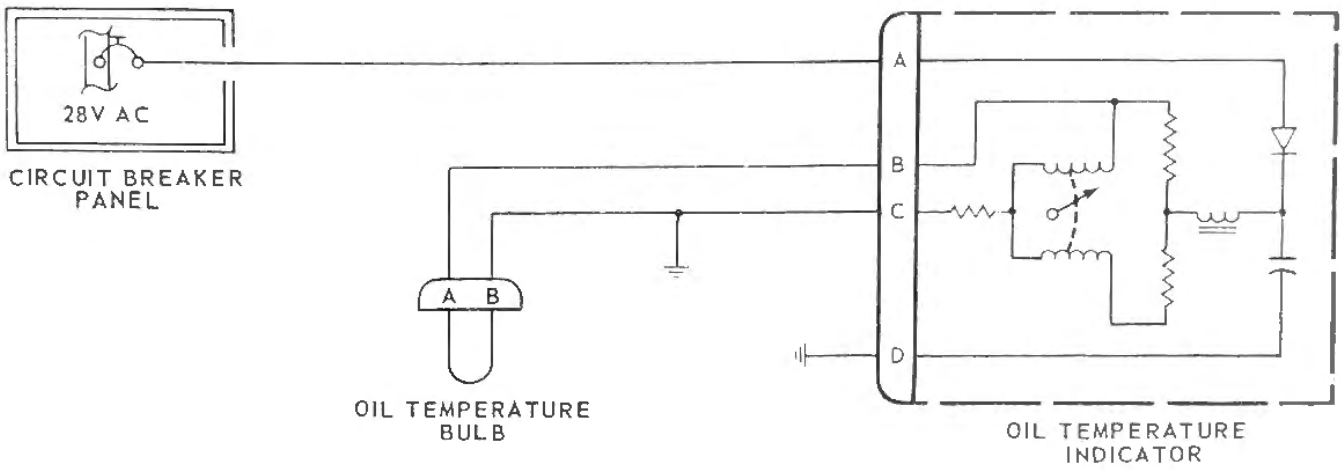
Oil Temperature Indicating System Component Location
Figure 1

4. Operation

A. Electrical power for the oil temperature indicating system is 28-volt, 400 cycle ac. The rectifier in the indicator changes the a-c power to d-c power. (See figure 2.) With power furnished to the system the oil temperature indicator continuously indicates existing engine oil temperature. When power is removed, the indicator pointer returns to the stop at the low end of the scale.

B. Circuit breakers are located as follows:

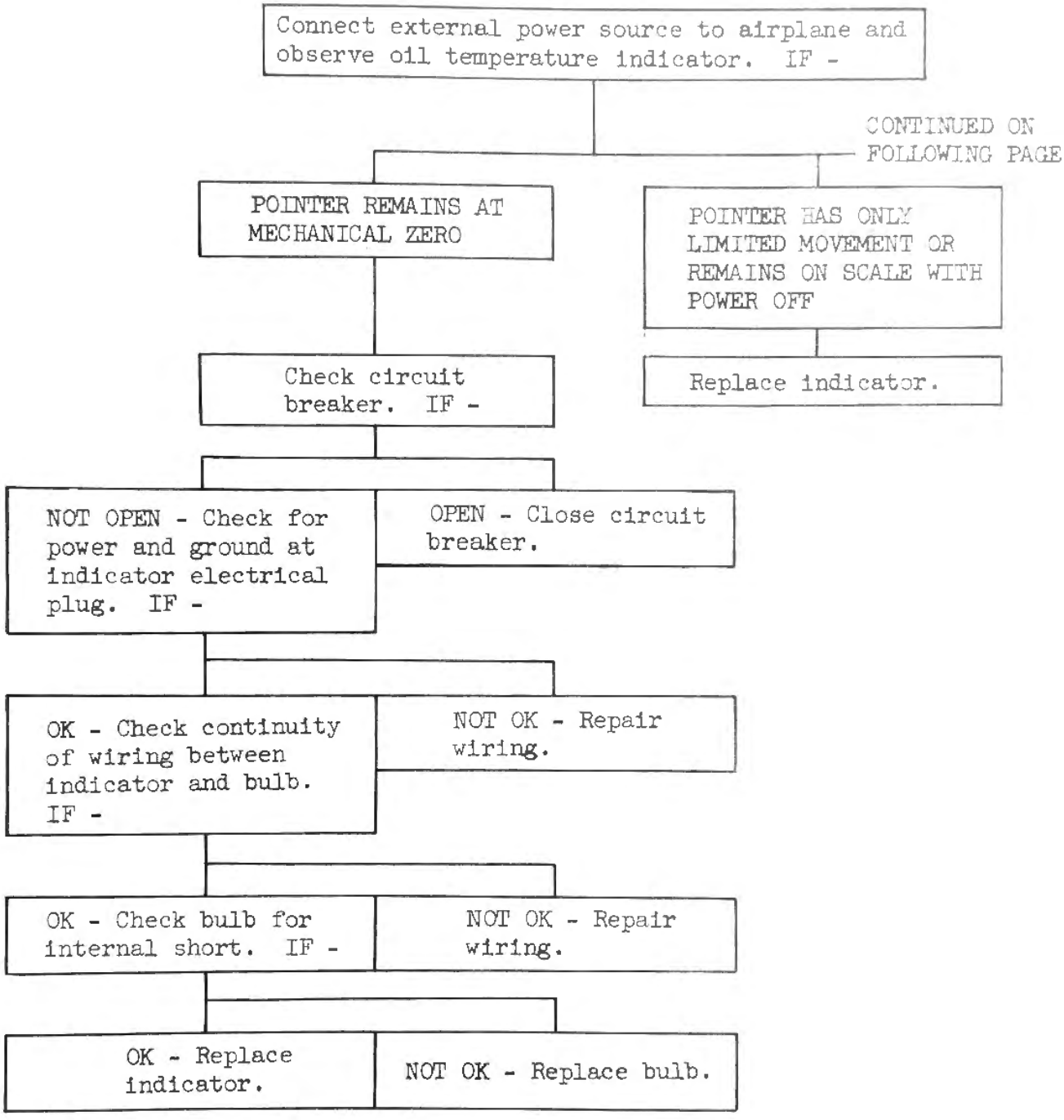
Engine No. 1 - 28 Volt A-C Circuit Breaker Panel (P7)
Engine No. 2 - 28 Volt A-C Circuit Breaker Panel (P2)
Engine No. 3 - 28 Volt A-C Circuit Breaker Panel (P3)
Engine No. 4 - 28 Volt A-C Circuit Breaker Panel (P4)



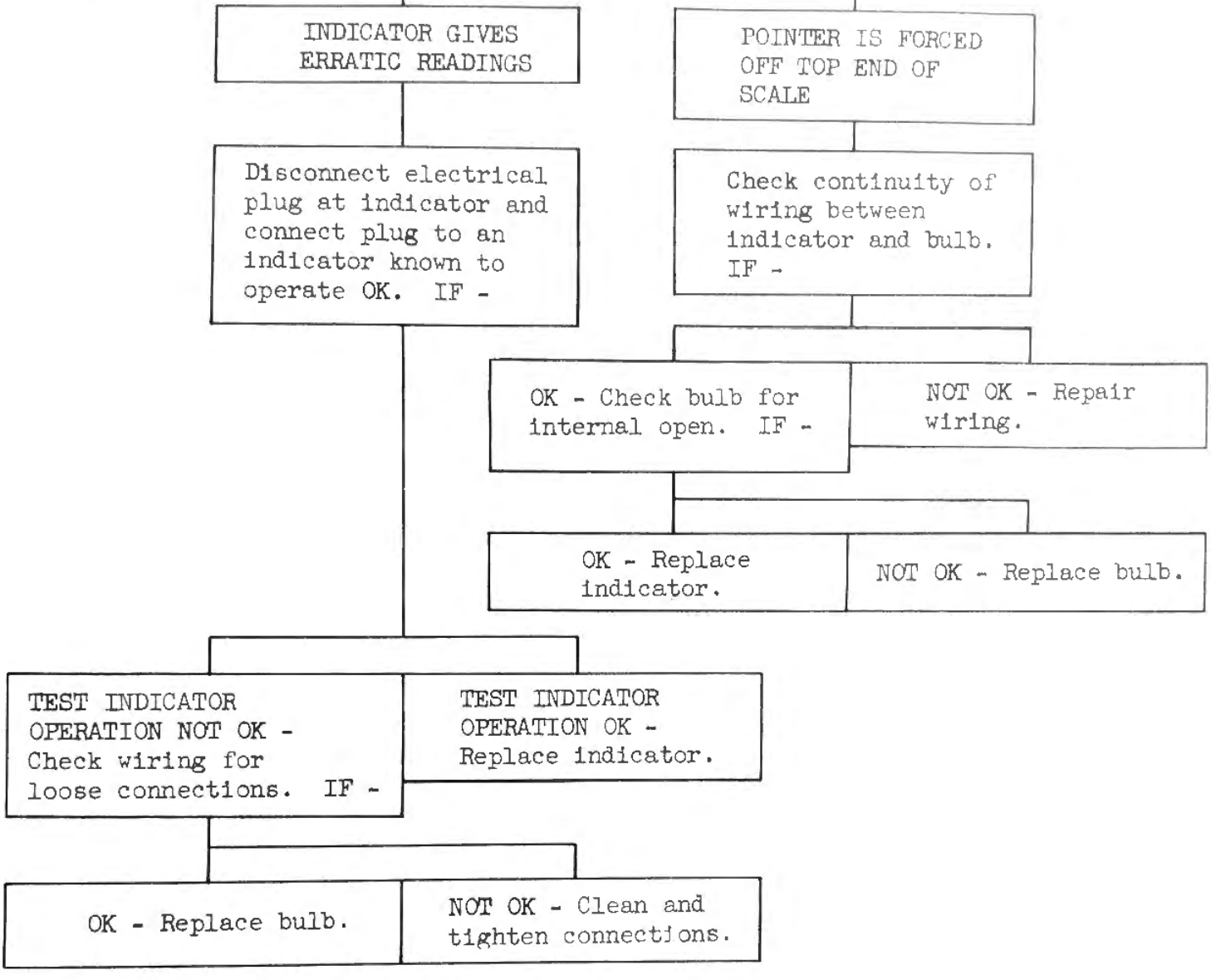
Oil Temperature Indicating System Circuit
Figure 2

END

OIL TEMPERATURE INDICATING SYSTEM - TROUBLE SHOOTING



CONTINUED FROM
PRECEDING PAGE



END

OIL TEMPERATURE INDICATING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Temperature Indicating System

A. General

(1) Testing the oil temperature indicating system is accomplished by establishing a temperature at the oil temperature bulb, measuring that temperature with a master thermometer, and comparing the readings of the oil temperature indicator and the master thermometer. The two should agree within 3°Centigrade.

B. Special Tools and Equipment

(1) Unbreakable master thermometer - calibrated in either °C or °F. (See 79-4-1, figure 201 for conversion.)

(2) Controlled hot oil bath.

C. Test Oil Temperature Indicating System

(1) Connect external power to airplane.

(2) Open applicable oil temperature indicator circuit breaker.

(3) Open right engine side cowl and remove oil temperature bulb.

(4) Reconnect electrical plug and close applicable oil temperature indicator circuit breaker.

(5) Submerge sensing portions of master thermometer and oil temperature bulb in controlled hot oil bath.

(6) Compare readings of master thermometer and oil temperature indicator.

END

OIL TEMPERATURE BULB - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Temperature Bulb

A. General

(1) There is no provision for adjustment incorporated in the design of the oil temperature bulb. Therefore, only testing of the unit may be accomplished.

(2) Testing the temperature bulb consists of measuring the resistance across the two pins of the element and comparing this resistance with values found on the chart of temperature-resistance values (figure 201).

(3) Temperature at the temperature bulb may be considered the same as ambient temperature if the engines have not been recently run. However, testing of the temperature bulb will probably be carried out on an engine that has just been shut down. In this case the temperature at the temperature bulb may be determined by either measuring the temperature of the oil in the supply tank and assuming the temperature at the temperature bulb to be the same or removing the temperature bulb from its mounting and allowing it to cool to ambient temperature before measuring its resistance. Although the latter method is a little more trouble, more accurate results should be obtained.

B. Special Tools and Equipment

(1) An ohm-meter or multimeter.

(2) Unbreakable master thermometer - calibrated in either °C or °F.

C. Test Oil Temperature Bulb

(1) Open applicable oil temperature indicator circuit breaker.

(2) Remove electrical plug.

(3) Determine temperature existing at temperature bulb by one of the following methods:

(a) Engine is thoroughly cool, measure ambient temperature with master thermometer.

(b) Engine is warm, remove temperature bulb and allow to thoroughly cool; then measure ambient temperature with master thermometer.

(c) Engine is warm, measure temperature of oil in supply tank with master thermometer; assume this temperature to be that of the temperature bulb.

(4) Measure resistance of temperature bulb by connecting leads of Ohm-meter to A(+) and B(-) terminals of temperature bulb.

(5) Temperature-resistance values should agree with those on chart. (See figure 201.)

(6) Deleted

TEMPERATURE		RESISTANCE (OHMS)	TEMPERATURE		RESISTANCE (OHMS)
°C	°F		°C	°F	
-70	-94	68.27 ± .50	+50	+122	108.39 ± .40
-60	-76	71.19 ± .50	+60	+140	112.28 ± .50
-50	-58	74.24 ± .40	+70	+158	116.27 ± .50
-40	-40	77.39 ± .40	+80	+176	120.36 ± .50
-30	-22	80.56 ± .40	+90	+194	124.55 ± .50
-20	-4	83.77 ± .40	+100	+212	128.85 ± .50
-10	+14	87.04 ± .40	+110	+230	133.26 ± .50
0	+32	90.38 ± .40	+120	+240	137.78 ± .60
+10	+50	93.80 ± .40	+130	+266	142.40 ± .60
+20	+68	97.31 ± .40	+140	+284	147.11 ± .60
+30	+86	100.91 ± .40	+150	+302	151.91 ± .60
+40	1104	104.60 ± .40	+200	+392	177.95 ± 1.00

CONVERSION:

°C TO °F °F = 9 5 °C I 32

°F TO °C °C = 5 9 (°F – 32)

Oil Temperature Bulb - Temperature Resistance Values
Figure 201

OIL PRESSURE WARNING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil pressure warning system provides the pilots with a warning indication of low engine oil pressure. The system consists of four amber warning lights on the engine instrument panel (figure 1), and four oil pressure switches, one at each engine.

B. The oil pressure switch at each engine senses the same oil pressure as the oil pressure transmitter. If engine oil pressure drops below approximately 28 psi the switch senses this condition and energizes the warning light on the engine instrument panel.

C. Electrical power for the oil pressure warning system is 28-volt dc through the radio and T-R circuit breaker panel (P5).

2. Oil Pressure Switch

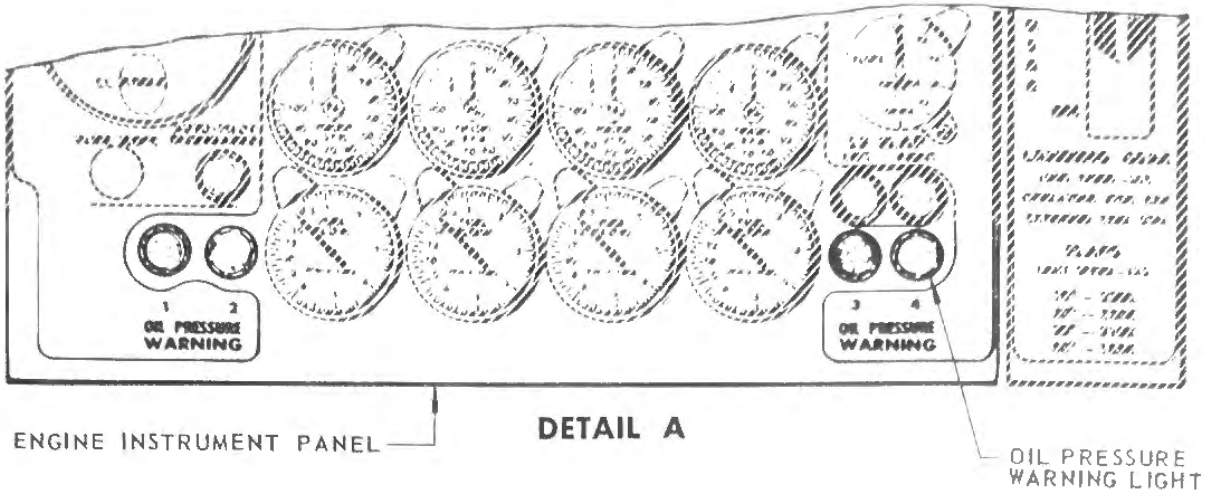
A. The oil pressure switch (figure 2), is a pressure actuated, single pole, double throw switch; sensing and acting upon the differential between engine oil pressure and engine vent pressure. The switch actuates at a maximum differential pressure of 36 psi, de-energizing the warning light when oil pressure increases; and re-actuates at a minimum differential pressure of 28 psi, energizing the warning light when oil pressure decreases. Adjustments are unnecessary throughout the service life of the oil pressure switch.

B. An oil pressure switch is located on the right side of each engine (figure 1), mounted slightly above the horizontal center line on the aft side of the nose cowl mounting flange.

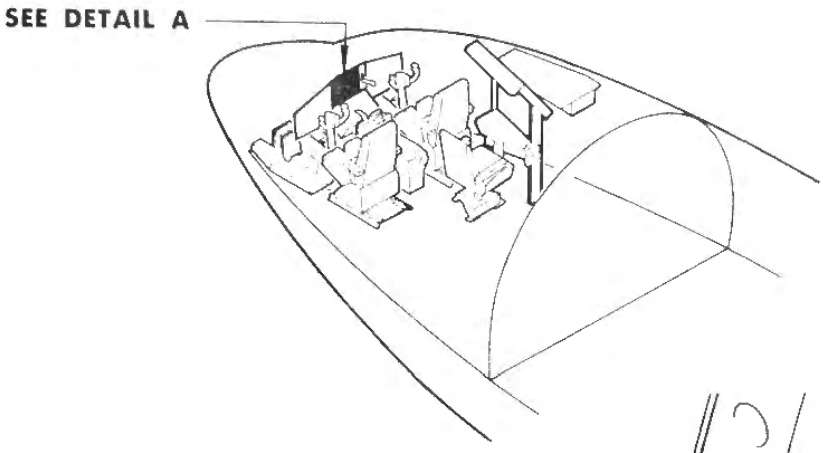
3. Oil Pressure Warning Light

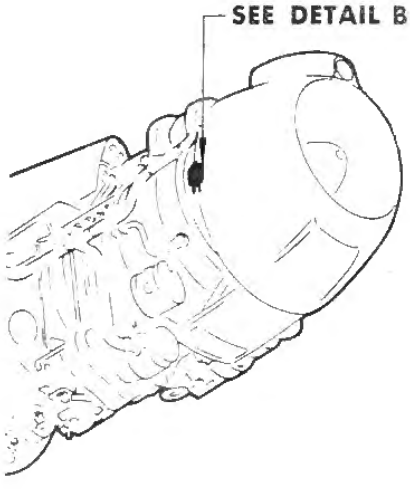
A. The oil pressure warning light is a press to test type indicator light (figure 2), with an integral dimmer feature.

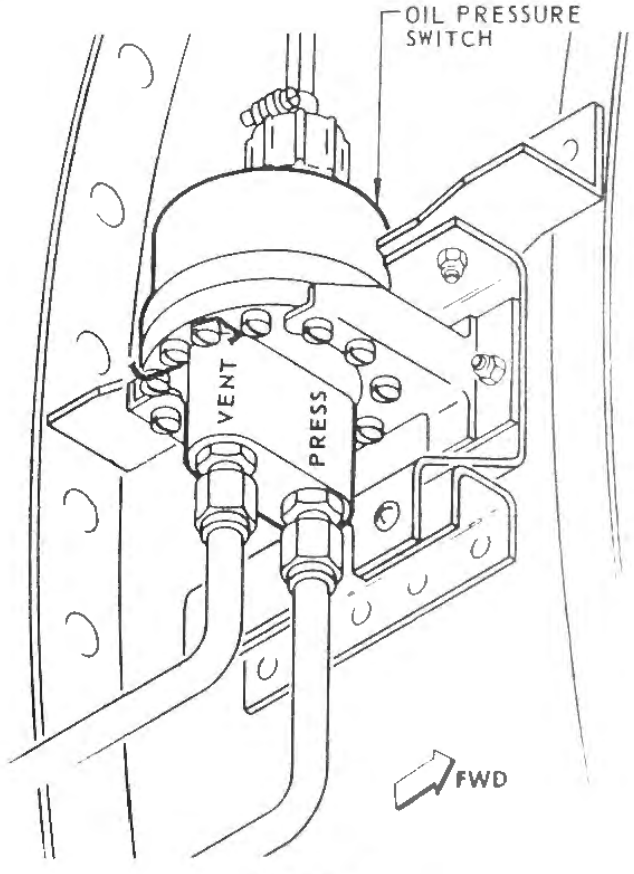
B. The oil pressure warning lights for each engine are mounted on the engine instrument panel (figure 1). The warning lights for engines 1 and 2 are located on the lower left corner of the panel. The warning lights for engines 3 and 4 are located on the lower right corner of the panel. The panel must be dropped to remove or install the lights.



DETAIL A

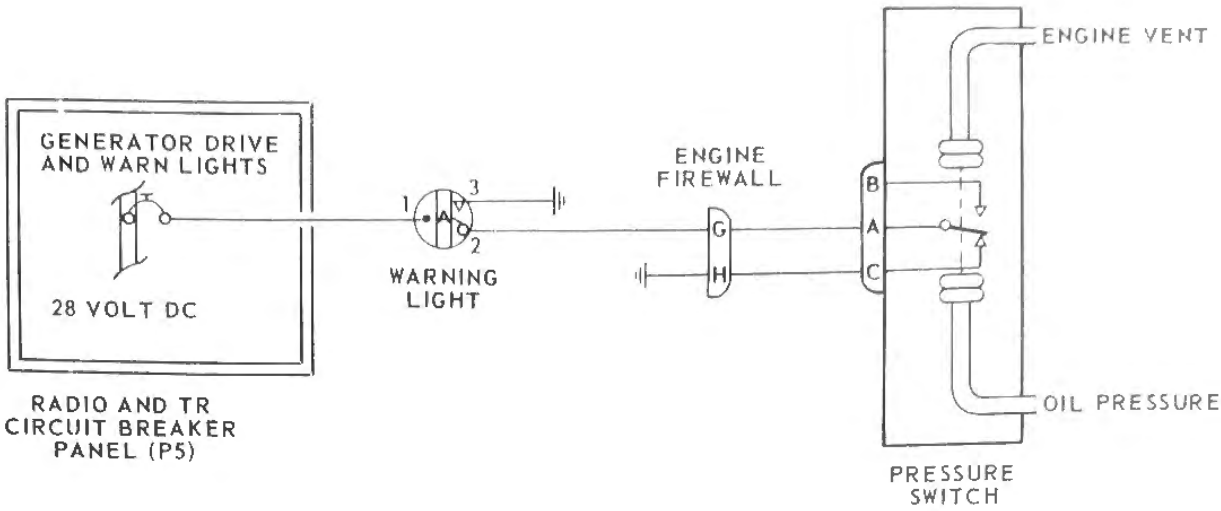






DETAIL B
(TYPICAL ALL 4 ENGINES)

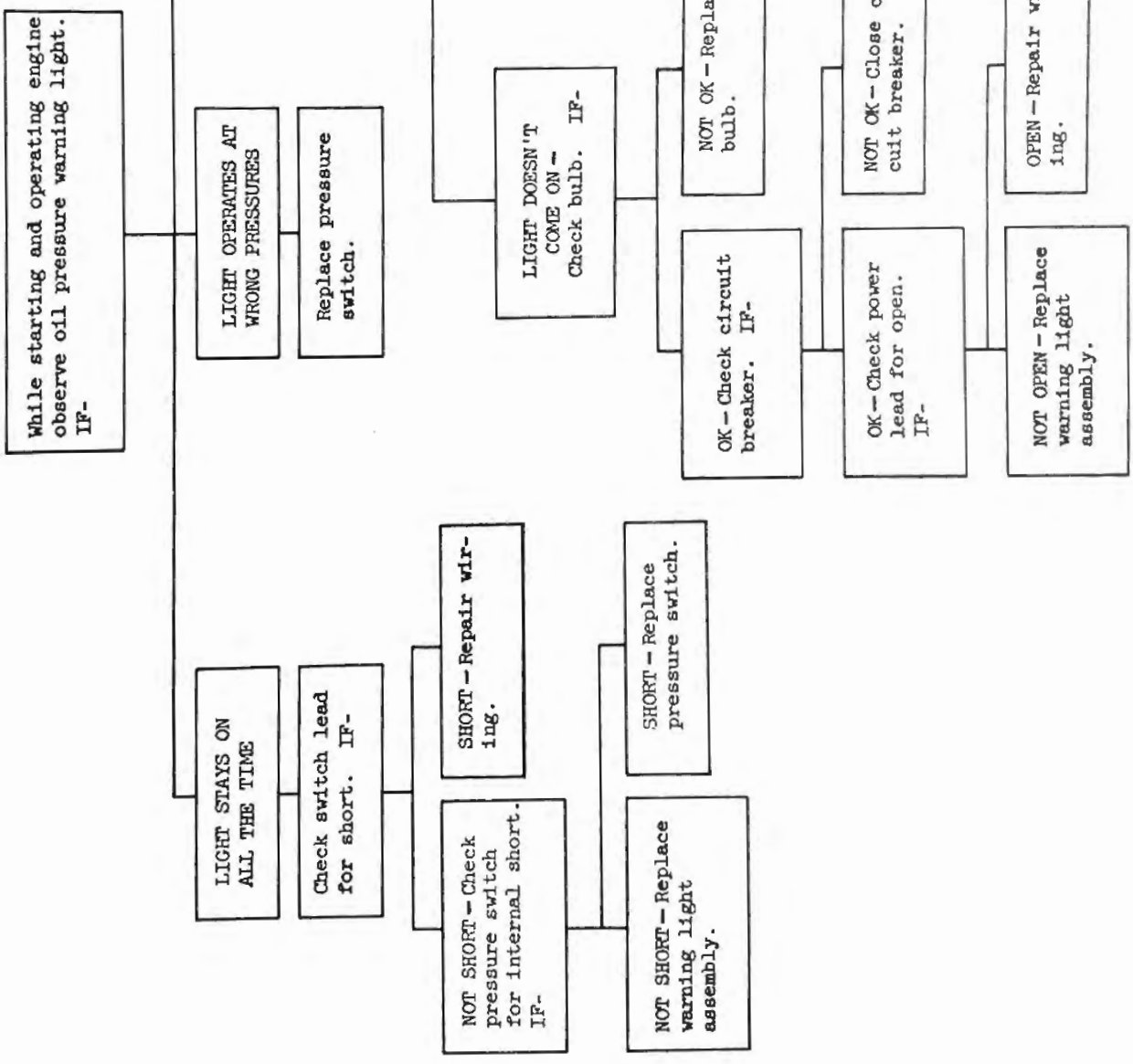
Oil Pressure Warning System Component Location
Figure 1



Oil Pressure Warning System Circuit
Figure 2

END

OIL PRESSURE WARNING SYSTEM - TROUBLE SHOOTING



OIL PRESSURE WARNING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Pressure Warning System

A. General

(1) Testing the oil pressure warning system may be done during the normal starting and run up of an engine.

(2) When an engine is started or shutdown the warning light operation can be checked against the oil pressure indicated by the oil pressure indicator on the flight engineer's lower panel.

B. Test Oil Pressure Warning System

(1) Before starting the engine, determine that the warning light is on.

(2) During starting of the engine, note at what pressure the warning light goes off. The light should be off before the oil pressure rises above 36 psi.

(3) When shutting down the engine, note at what pressure the warning light comes on. The light should be on before the oil pressure falls below 28 psi.

END

OIL PRESSURE SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation Oil Pressure Switch

A. Remove Oil Pressure Switch (See figure 201.)

(1) Open respective oil pressure warning circuit breaker on radio and T-R circuit breaker panel (P5).

(2) Remove electrical plug from oil pressure switch.

(3) Unscrew vent and oil tube fittings.

(4) Remove two switch mounting screws and lift switch out.

(5) If the oil pressure switch is to be replaced with a new unit remove the unions and O-rings.

B. Install Oil Pressure Switch (See figure 201.)

(1) If a new unit is being installed, install the unions with new O-rings.

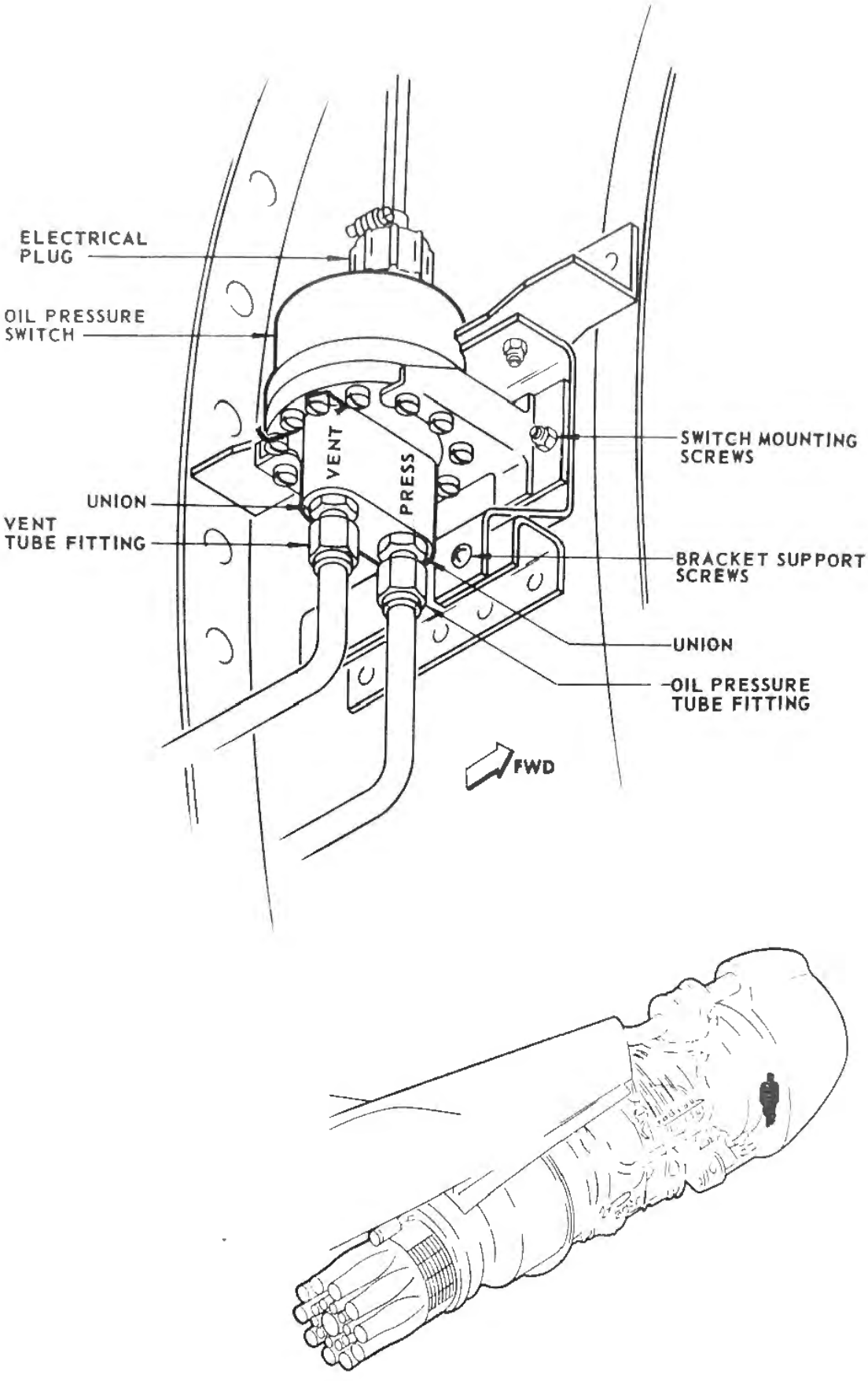
(2) With oil pressure switch in place, start threads of vent and oil tube fittings.

(3) Install two switch mounting screws.

(4) Tighten vent and oil tube fittings.

(5) Connect electrical plug.

(6) Close respective oil pressure warning circuit breaker on radio and T-R circuit breaker panel (P5).



Oil Pressure Switch Installation
Figure 201

ENGINE OIL SYSTEM - DESCRIPTION AND OPERATION

1. General

A. Each engine has an oil system which supplies oil to cool and lubricate the engine gears and bearings. Scavenge pumps pass the oil through a fuel/oil cooler before returning it to the engine.

NOTE: This section, 79-6-0, covers only the engine oil tank, fuel/oil cooler, oil system operation and servicing procedures. Refer to Chapter 71, "Power Plant - General," for oil pressure adjustment procedures and to Chapter 72, "Engine," for detailed coverage of the oil tank, fuel/oil cooler, and other engine manufacturer supplied components.

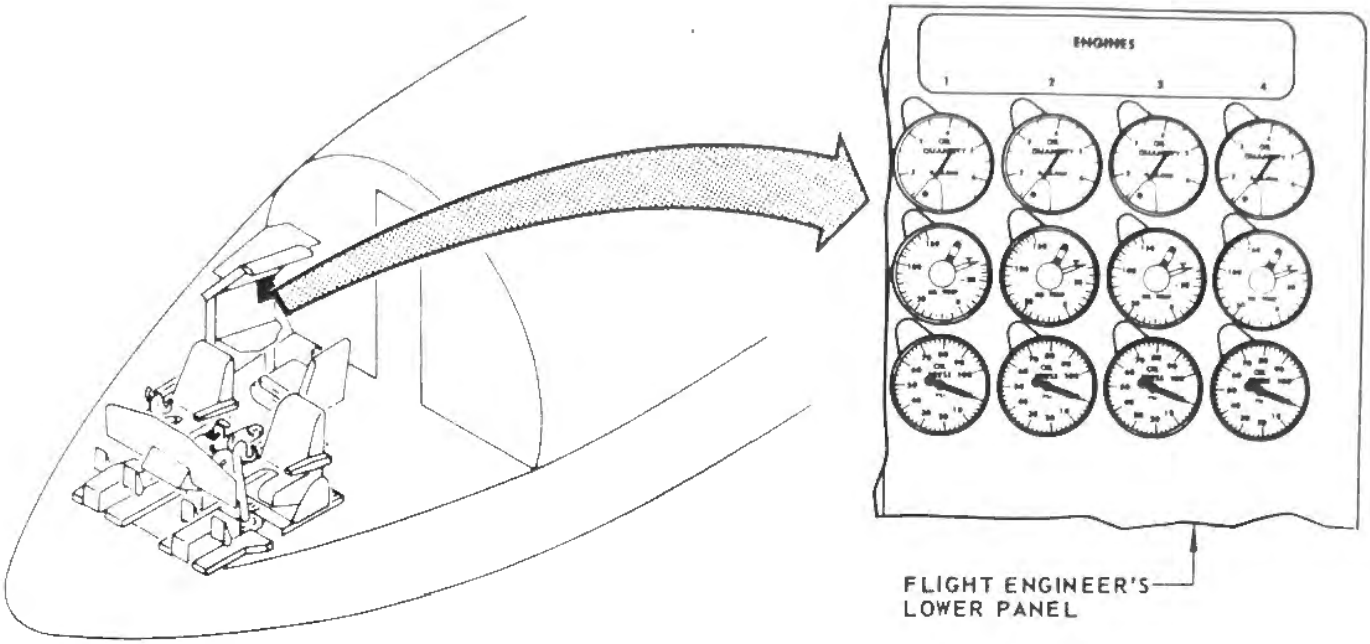
B. Oil flows by gravity from the oil tank to an engine driven oil pump inside the engine accessory drive gearbox. After leaving the pump the oil flows through an oil strainer, a pressure relief valve, an antisiphon check valve and then to the various bearings and gears in the engine. Return oil is picked up by the scavenge pumps and returned to the oil tank by way of the fuel/oil cooler.

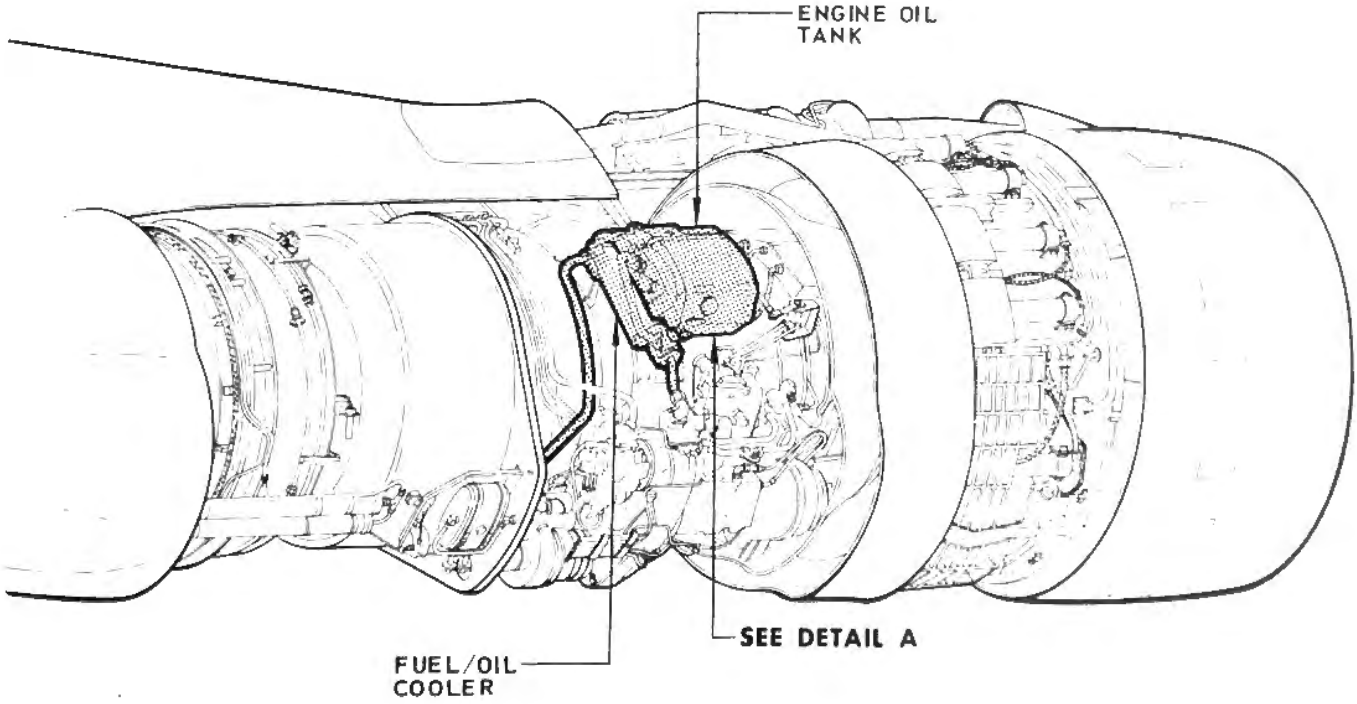
2. Engine Oil Tank

A. The engine oil tank stores and deaerates engine lubricating oil. Each tank has a total enclosed volume of 8.3 gallons. Normal oil level should be up to the filler port when servicing the engine immediately following a shutdown. For a new or completely drained engine, oil must be added to the level of the filler port before starting and operating. Oil in the engine system is distributed as follows: all engines require approximately 0.7 gallon of oil in the tank outlet pipe to keep engine pump fully primed; approximately two gallons will fill the bearing galleries the first time the engine is motored, only a part of this two gallons will be scavenged back to the oil tank. Following an engine run, top the tank up to the full level. During engine operation only the oil indicated (flight engineer's indicators) in the tank may be considered as usable (burnable) oil when calculating the maximum duration of an engine mission. The remaining space in each tank is to accommodate expansion and oil foaming.

B. The tank assembly includes a deaerator inside the tank, a scupper drain at the filler cap well, a dip stick attached to the underside of the filler cap, and a drain valve at the bottom of the tank. The oil tank is strapped to the upper side of the front compressor case.

C. The deaerator separates most of the air from the returning oil to minimize foaming. The tank is vented directly to the engine breather chamber. A drain valve allows complete drainage of the tank. The scupper drain collects and drains overboard any oil spilled or overfilled during servicing.





Engine Oil System Equipment Location
Figure 1 (Sheet 1 of 2)

3. Fuel/Oil Cooler

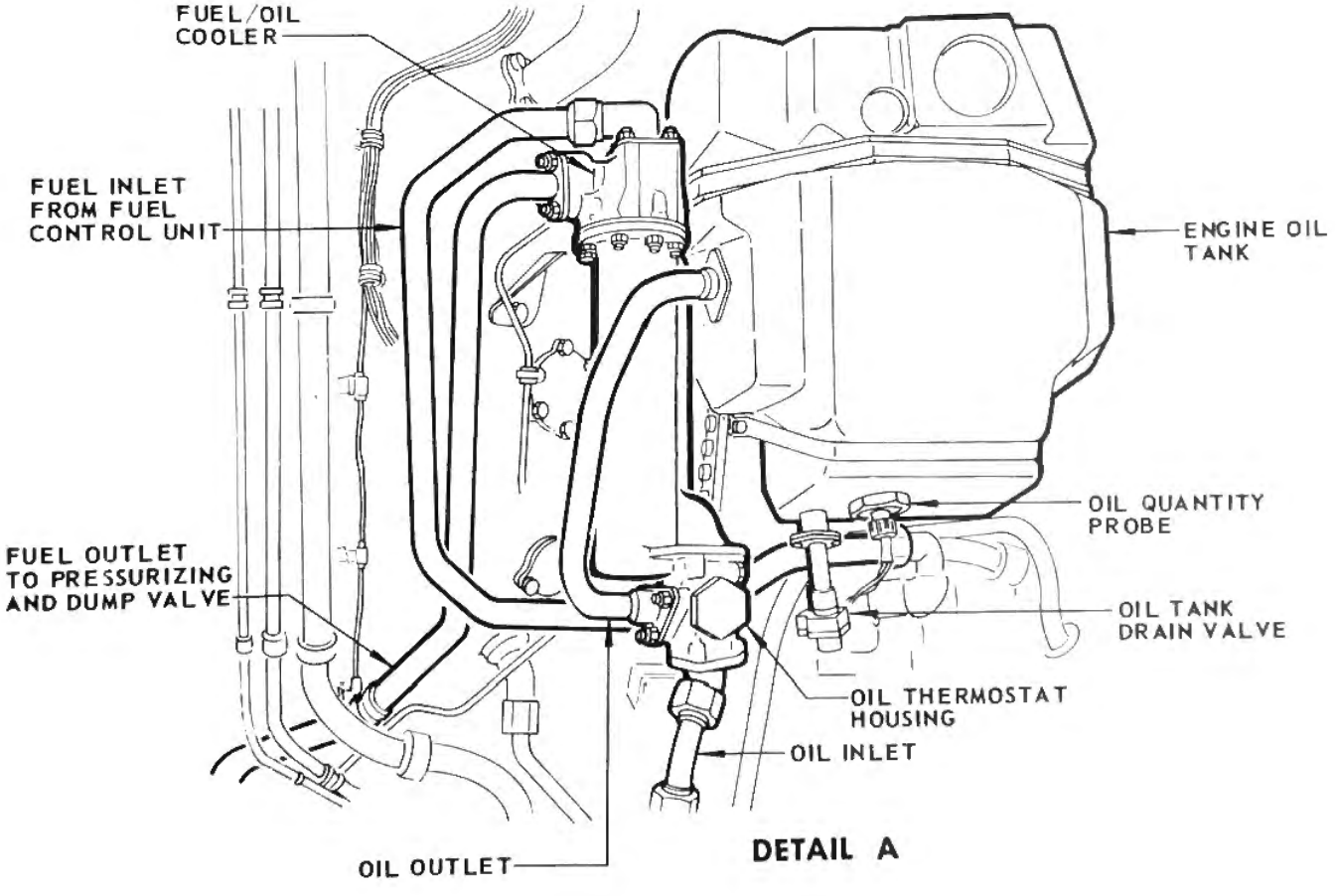
A. Oil from the scavenge pumps leaves the engine through a plumbing connector on the top right face of the accessory gearbox and passes through a line to the fuel/oil cooler located slightly aft of the oil tank. (See figure 1.) A thermostatic control valve set between the oil inlet and outlet passages maintains the outlet oil temperature at a constant level. Oil leaving the cooler is returned to the tank. See Chapter 72, "Engine."

B. Metered fuel from the engine fuel control unit passes through the cooler removing heat from the engine oil stream. The fuel then continues on to the pressurizing and dump valve.

4. Operation

A. Oil flows from the engine oil tank to the engine driven oil pump. The pump output passes through a filter and pressure relief valve before being distributed to the various engine bearings. Scavenge oil pumps, return the oil to the engine oil tank through the fuel/oil cooler.

B. The oil system lubricates and removes excess heat from the engine main bearings. Metered fuel from the fuel control unit is utilized in the fuel/oil cooler (heat exchanger) to lower the oil temperature to a predetermined value.



Engine Oil System Equipment Location
Figure 1 (Sheet 2 of 2)

ENGINE OIL SYSTEM - MAINTENANCE PRACTICES

1. Servicing Engine Oil System

A. General

(1) Servicing the engine oil system consists of either replenishing or changing the oil supply. Engine oil change procedures are covered in this section. Refer to Chapter 12, "Oil Servicing," for replenishment procedures.

B. Materials and Equipment

(1) Ten gallon capacity container

(2) Two one-gallon containers

C. Change Engine Oil

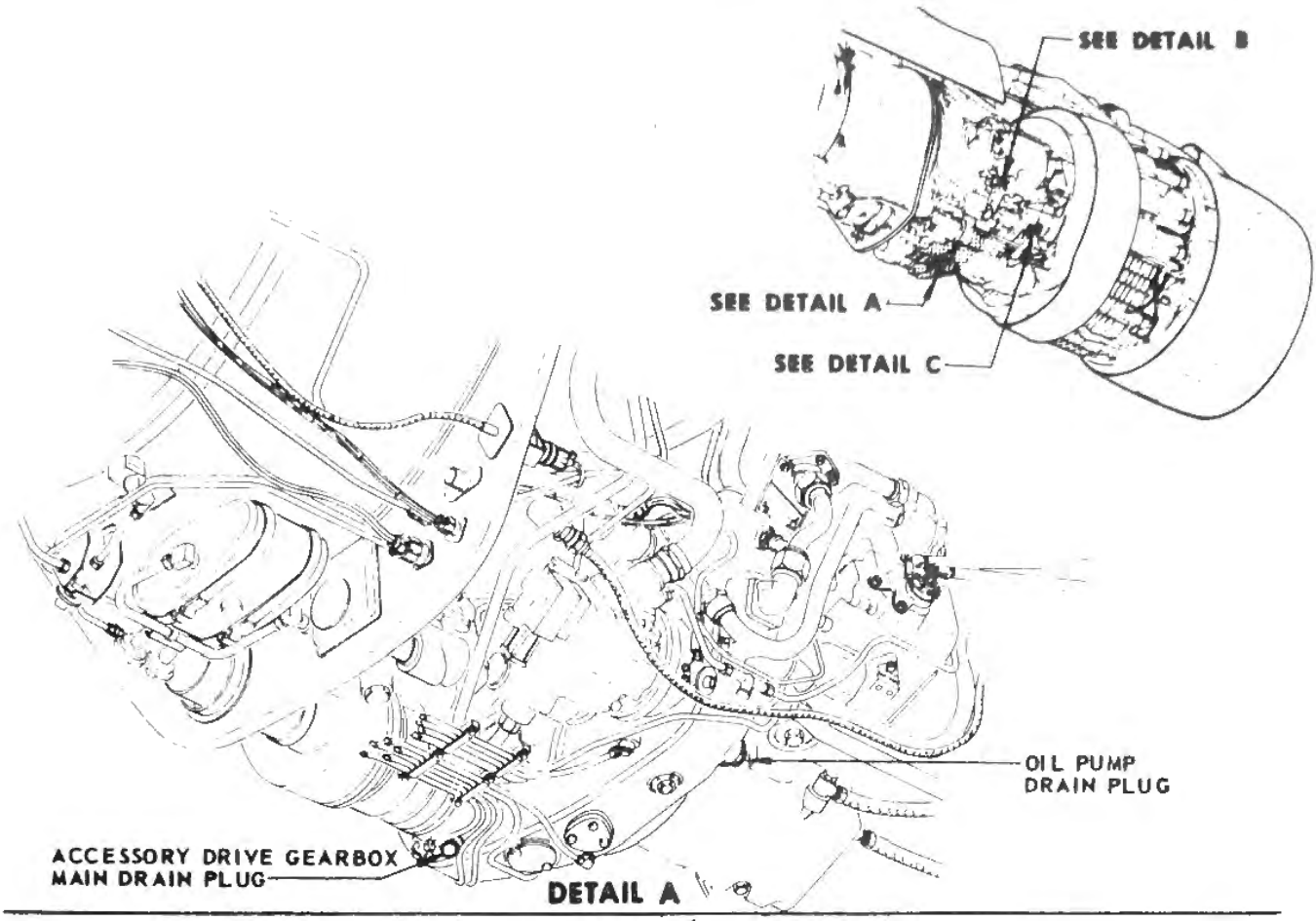
(1) Open left and right side cowl panels.

(2) With suitable receptacles placed to catch drained oil, open oil tank drain valve (detail B, figure 201), disconnect oil strainer inlet pressure sensing line (detail C), accessory drive housing drain plug and oil pump drain plug (detail A).

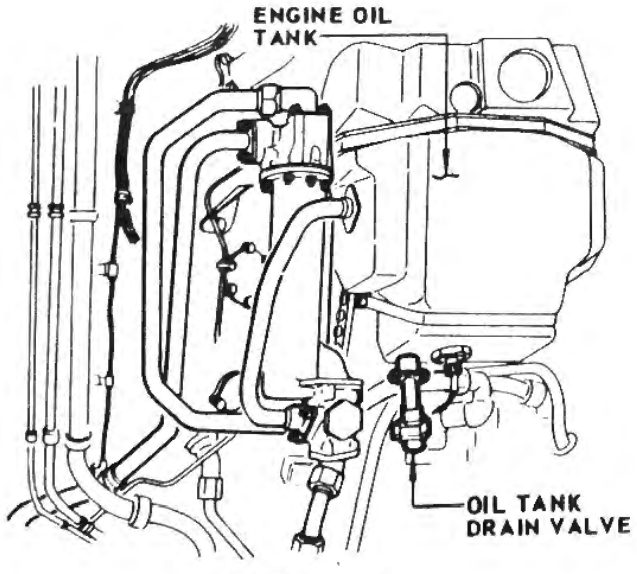
(3) When oil drainage has receded to slow drip, replace drain plugs and connect line removed in step (2) and close oil tank drain valve.

NOTE: On new or overhauled engines, care should be taken to drain as much preservative oil as possible. Failure to fully drain preservative oil before servicing the oil system with TJ-15 oil will result in sluggish oil quantity system operation.

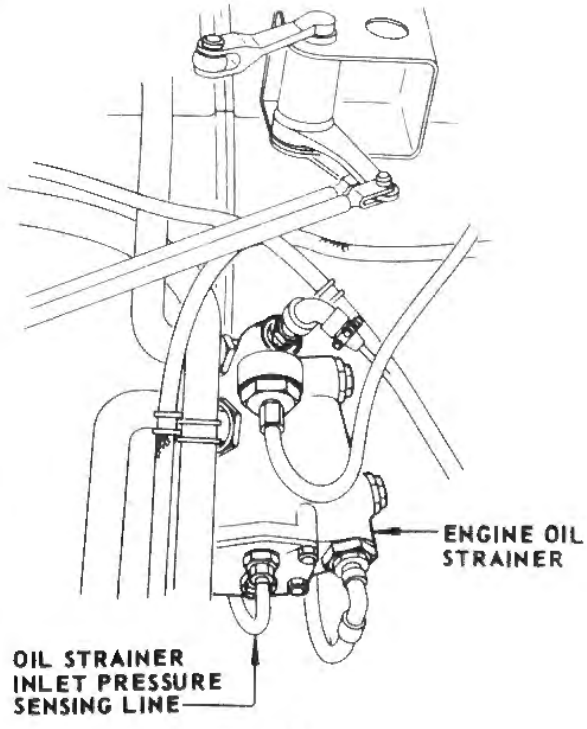
(4) Fill oil tank, secure filler cap and close side cowl panels.



DETAIL A



DETAIL B



DETAIL C

OIL QUANTITY INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil quantity indicating system provides indication in the control cabin of actual oil quantity (gallons) in each engine oil tank. The system consists of one circuit for each engine. Each circuit contains an oil quantity tank unit located in the engine oil tank, and an oil quantity indicator on the flight engineer's lower panel. A "PUSH TO TEST GAGES" switch located close to the gages is common to each circuit. (See figures 1 and 2.) Electrical power for the oil quantity indicating system is 115-volt, 400-cycle ac.

B. The system uses electrical capacitance probes as tank units, each probe controls a self-balancing bridge circuit contained in the respective indicator. Oil level and oil dielectric constant determine the capacitance of the tank units. The oil quantity indicator pointer is connected to the balance mechanism and provides continuous indication of oil quantity on the dial face.

2. Oil Quantity Tank Unit

A. The oil quantity tank unit probe is composed of two separate capacitors. A quantity measuring capacitor and a compensator unit to minimize the effects of oil dielectric changes due to temperature or variations in composition.

B. The upper section of the tank unit is an electrostatic capacitor consisting of two concentric electrodes insulated from each other by plastic centering spacers. The inner electrode is a plastic tube with two separate metallic areas printed on its surface. One area is active and is connected to the amplifier input in the system circuit. The other area is grounded to prevent fringing of the active area. The outer electrode is an aluminum tube with an insulating finish on its outer surface.

C. The lower, or compensator, section of the probe is a group of concentric aluminum tubes spaced and insulated from each other. Since the compensator is at the lower end of the tank unit it will remain submerged at the lowest usable level of oil in the tank.

D. The lower end of the tank unit is open to permit oil to flow between the electrodes to the same level as that in the tank. The oil between the electrodes provides the dielectric which is the variable factor of the capacitor.

E. The oil quantity tank units are mounted in fittings welded into the bottom of each engine oil tank. (See figure 1.)

3. Oil Quantity Indicator

A. The oil quantity indicator contains a motor driven self-balancing capacitance bridge indicator unit. The unit consists of a reversible motor driving a rebalance potentiometer and dial pointer assembly through a gear train. Other items included are a capacitance bridge network, a three stage transistorized amplifier, a rectifier to provide d-c power for the transistors, and various transformers. (See figure 2.) The complete indicator assembly is hermetically sealed.

B. The oil quantity indicators, one for each engine, are located in a horizontal row on the right-hand portion of the flight engineer's lower panel. (See figure 1.) The indicators are secured to the panel by a standard clamp mounting and have an electrical disconnect plug on their rear face.

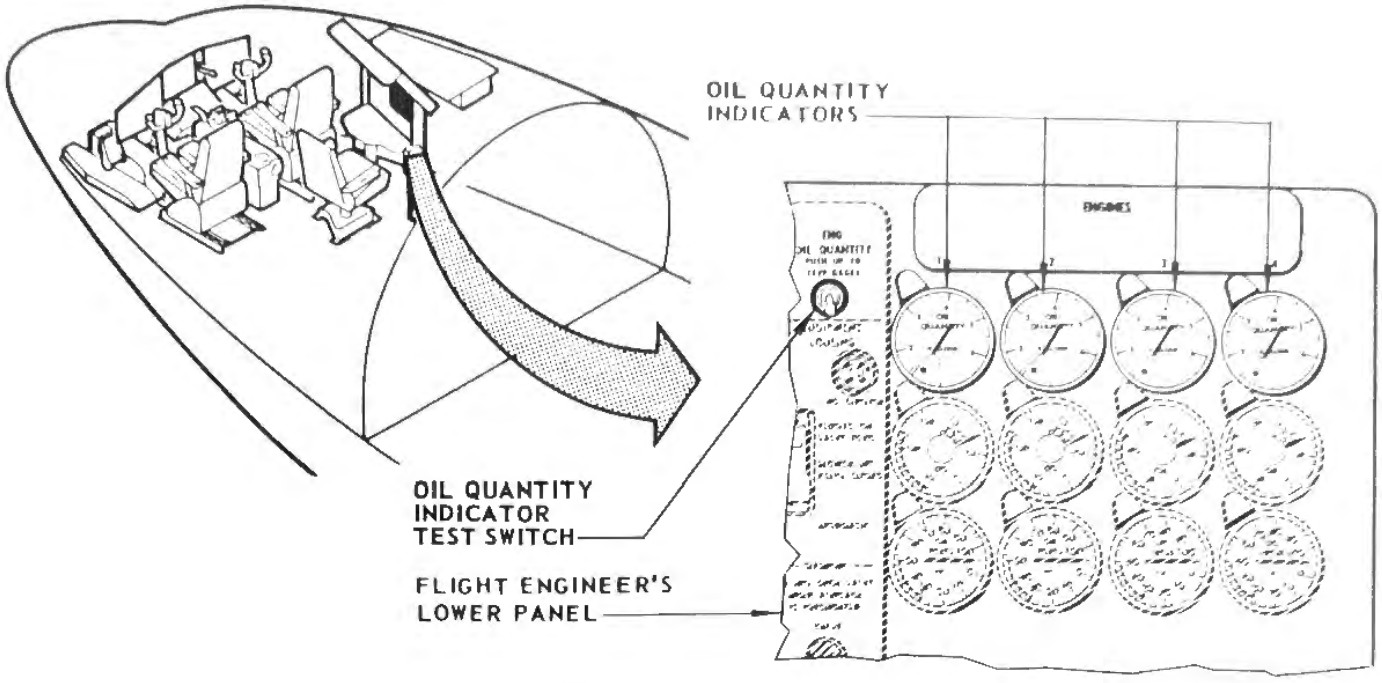
4. Operation

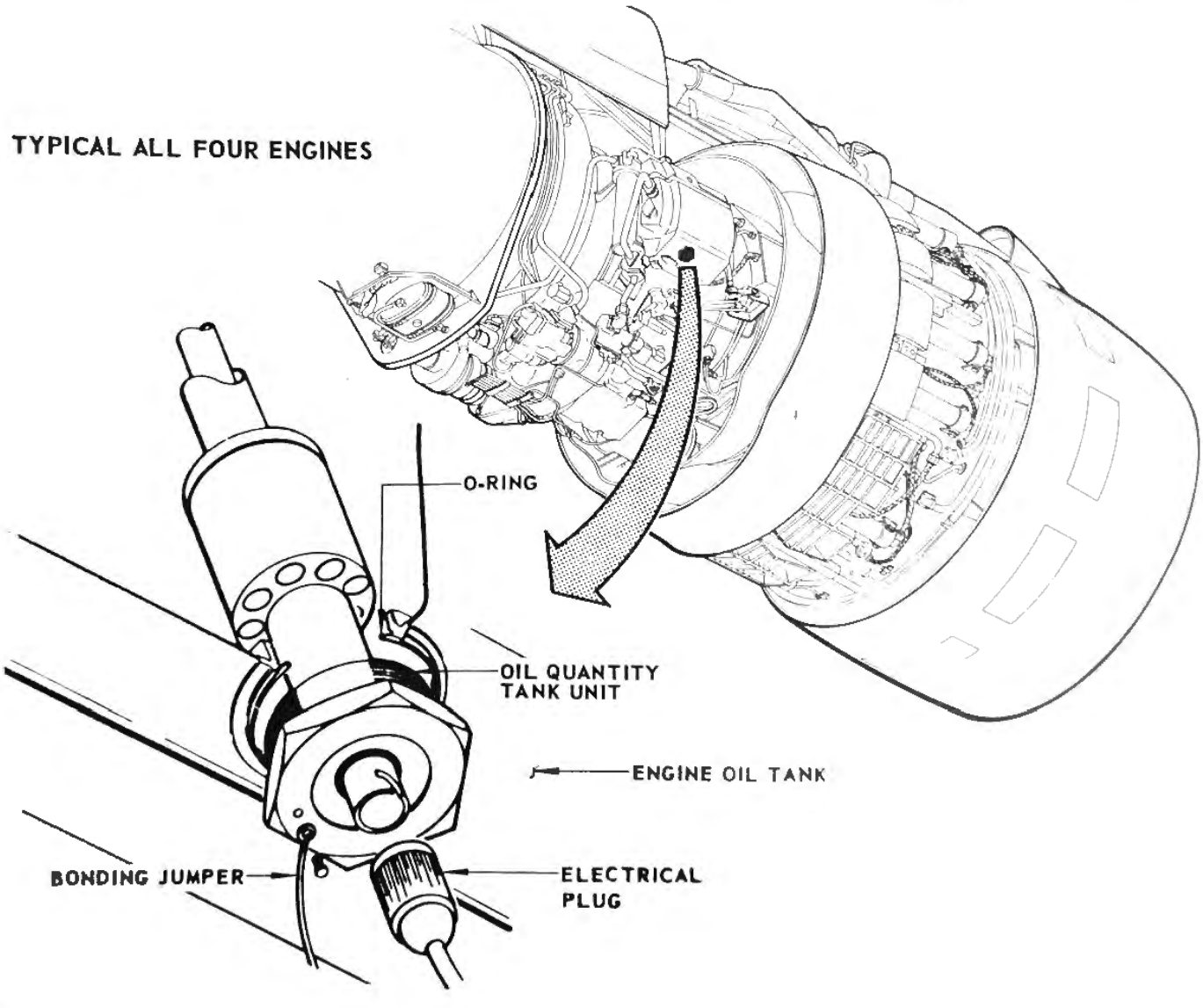
A. The oil level in the engine oil tank determines the capacitance of the oil quantity tank unit. This capacitance is a part of the self-balancing capacitance bridge network in the indicator. When in a balanced state this bridge network shows the actual gallons of oil in the tank on the indicator dial. (See figure 2.)

B. The "PUSH TO TEST GAGES" switch is common to all four oil quantity indicating circuits. Closing the switch grounds the current on the tank unit side of the bridge. (See figure 2.) As a result, all the indicators drive toward the empty end of the dial. If the system is functioning properly, the indicators will return to their original position when the test switch is released.

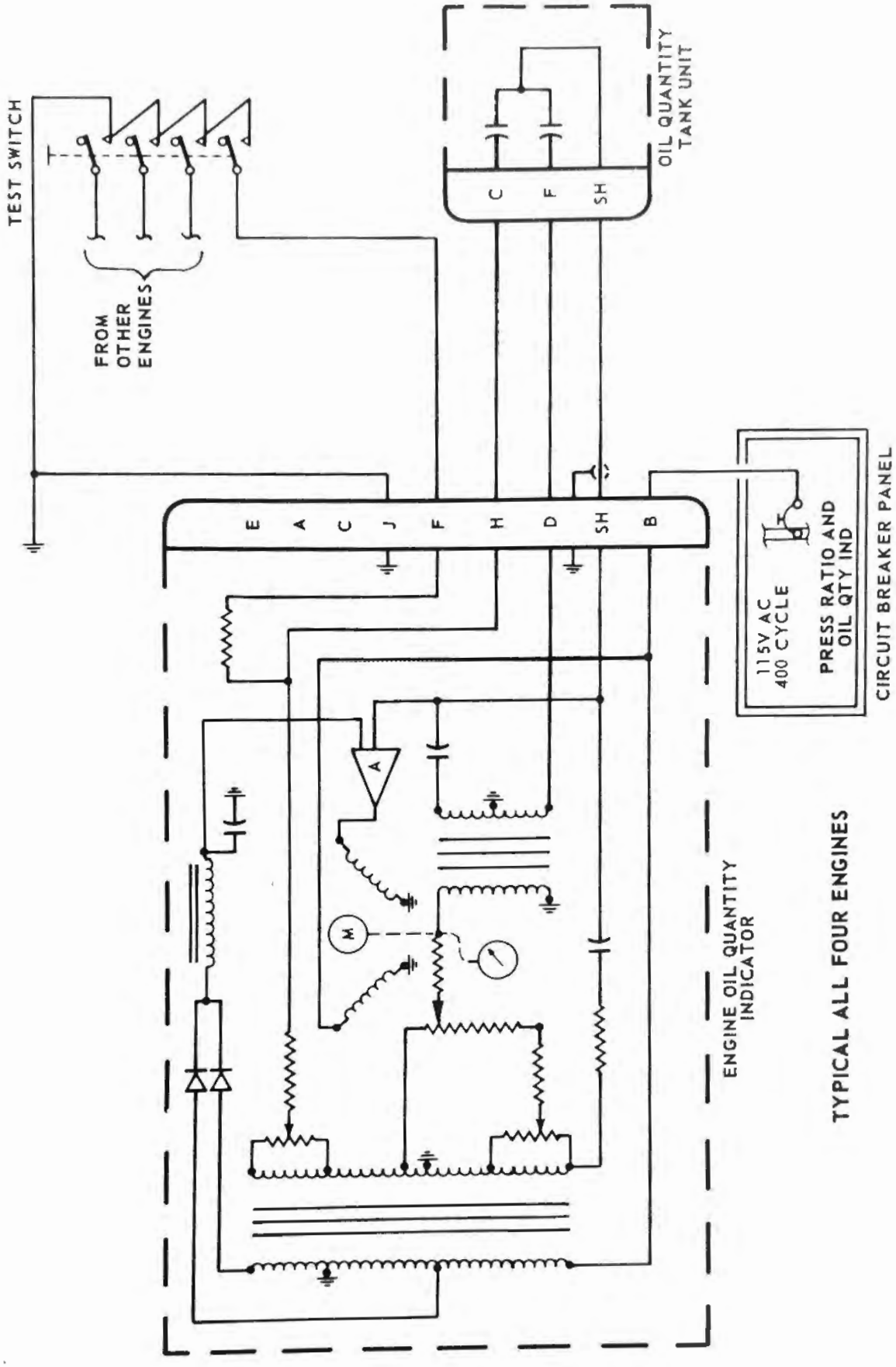
C. Electrical power for the oil quantity indicating system is 115-volt, 400-cycle ac through the following circuit breaker panels:

Engine No. 1 - A-C Bus No. 1 Circuit Breaker Panel (P1)
Engine No. 2 - A-C Bus No. 2 Circuit Breaker Panel (P2)
Engine No. 3 - A-C Bus No. 3 Circuit Breaker Panel (P3)
Engine No. 4 - A-C Bus No. 4 Circuit Breaker Panel (P4)



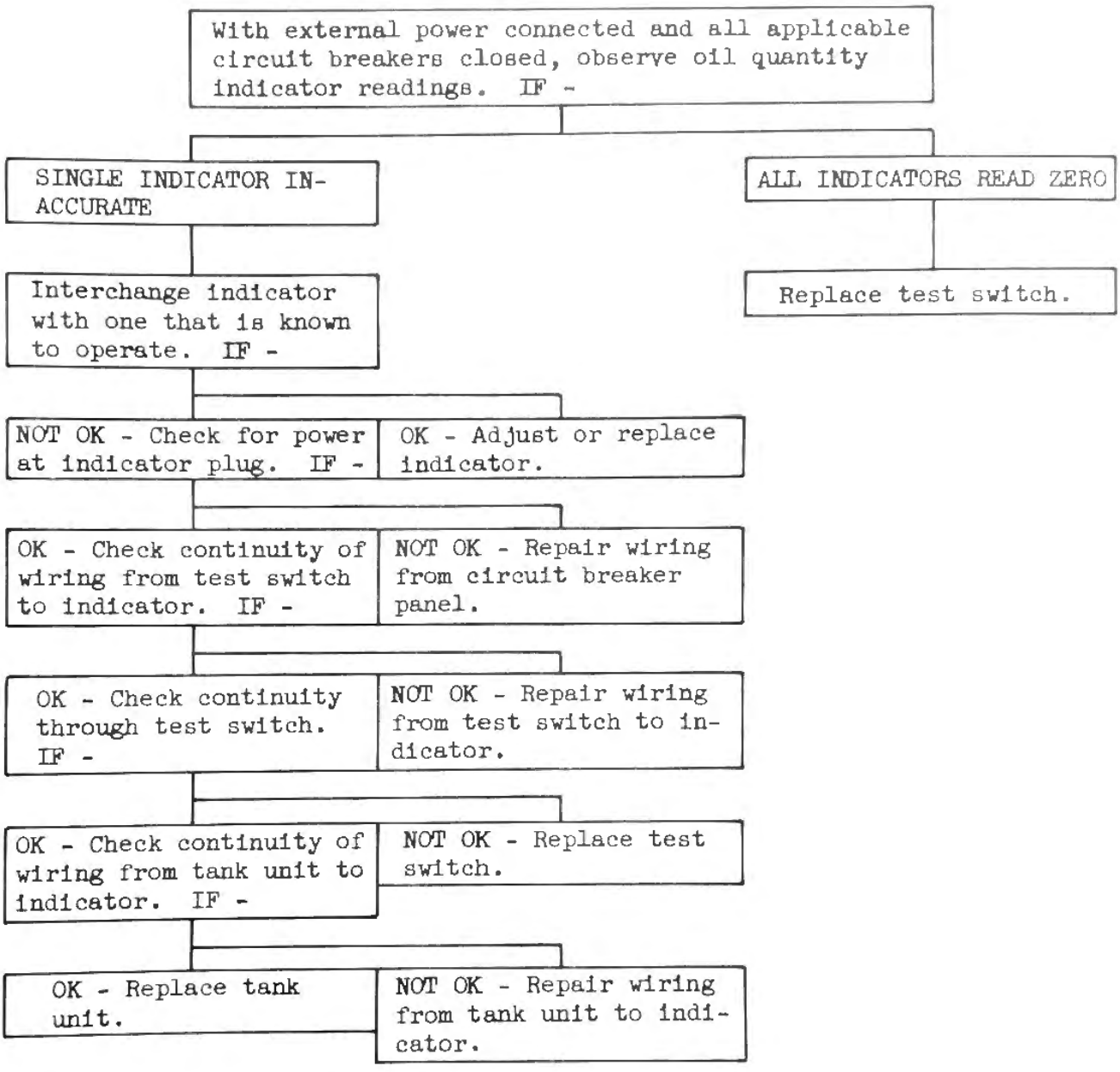


Oil Quantity Indicating System Equipment Location
Figure 1



Oil Quantity Indicating System Circuit
Figure 2

OIL QUANTITY INDICATING SYSTEM - TROUBLE SHOOTING



OIL QUANTITY TANK UNIT - MAINTENANCE PRACTICES

1. Removal, Installation Oil Quantity Tank Unit

A. Remove Oil Quantity Tank Unit

(1) Open right side cowl panel.

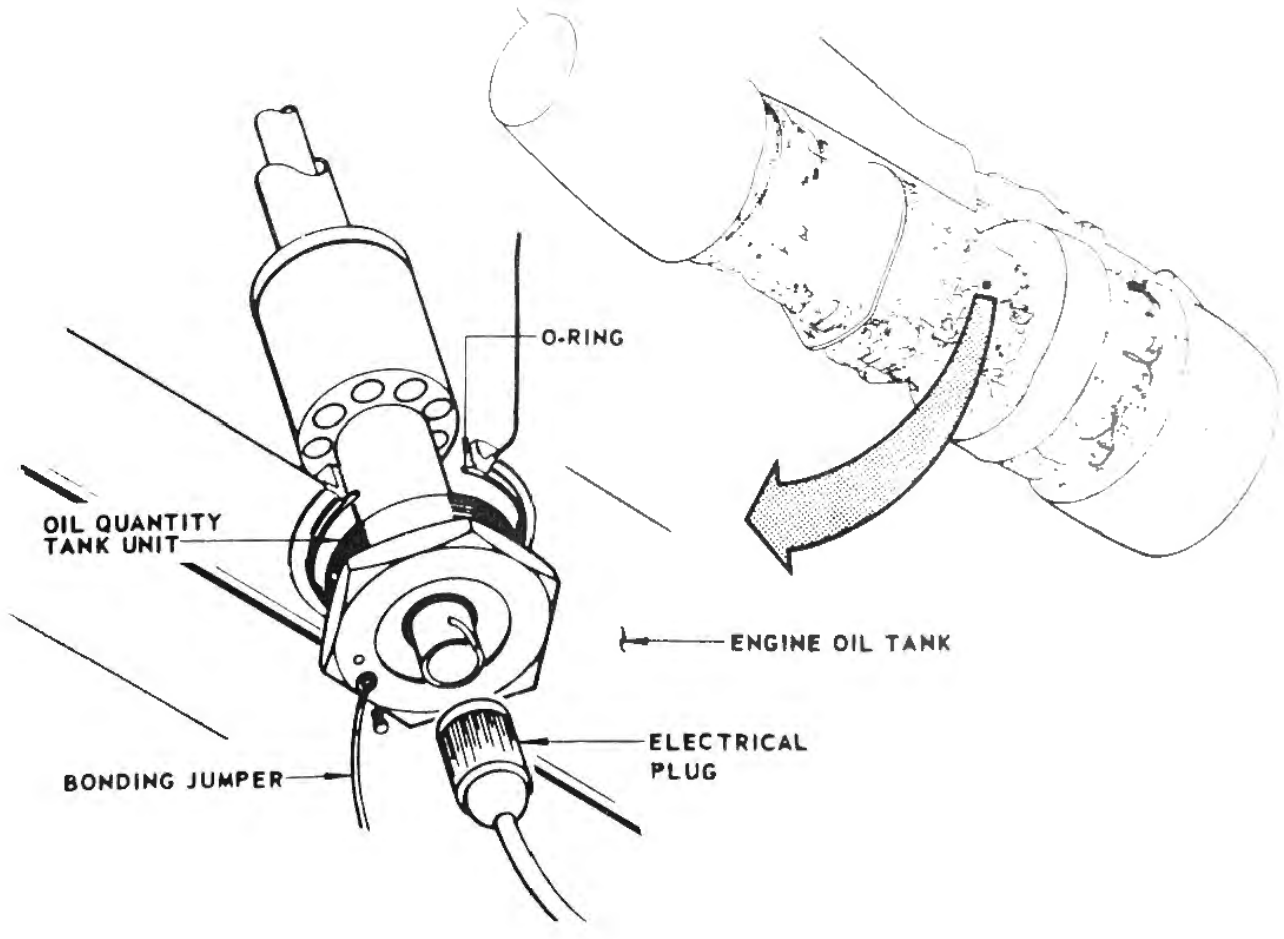
(2) Drain engine oil tank.

(3) Open respective oil quantity circuit breaker on a-c bus circuit breaker panel P1, P2, P3 or P4.

(4) Remove electrical plug. (See figure 201.)

(5) Remove bonding jumper.

(6) Unscrew oil quantity tank unit and remove tank unit and O-ring from engine oil tank.



Oil Quantity Tank Unit Installation
Figure 201

B. Install Oil Quantity Tank Unit (See figure 201.)

(1) With a new O-ring in place, install oil quantity tank unit and torque to 700 to 900 pound-inches.

(2) Install safety wire.

(3) Install bonding jumper.

(4) Connect electrical plug.

(5) Close right side cowl panel.

(6) Adjust oil quantity indicating system. See 79-7-0.

END

OIL PRESSURE INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil pressure indicating system shows the engine oil pressure on an indicator located on the flight engineer's lower panel. The components of the system for each engine are an oil pressure transmitter and an indicator. (See figure 1.)

B. The oil pressure transmitter senses the engine oil pressure at the outlet of the oil strainer. The pressure value is transmitted electrically to the indicator where it is shown as a reading on a dial face.

2. Oil Pressure Transmitter

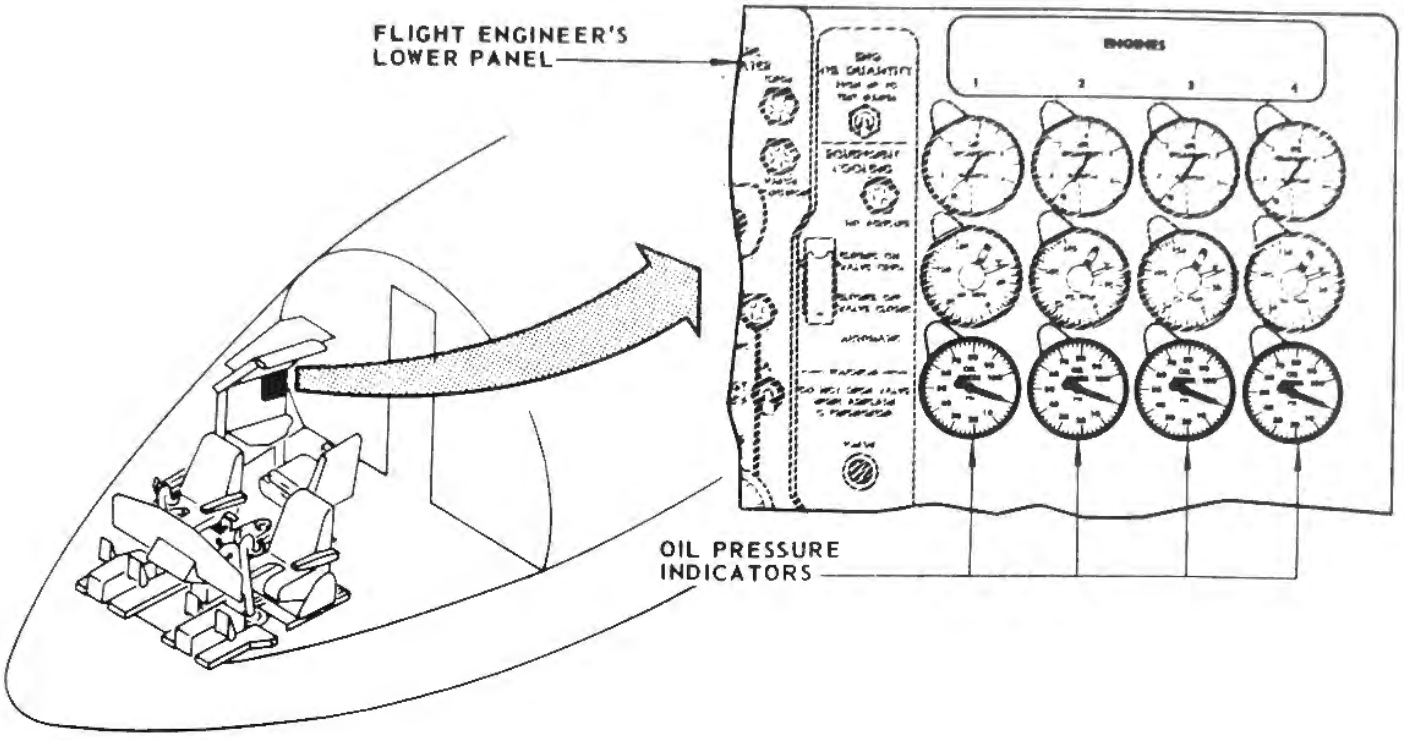
A. The oil pressure transmitter has a synchro motor which is turned through a gear train by two opposing Bourdon tubes. Oil pump output pressure is impressed upon one Bourdon tube. The other Bourdon tube senses either engine ambient pressure or accessory drive gearbox vent pressure depending on the power plant configuration. The pressure differential between the two Bourdon tubes is impressed upon the gear train which rotates the synchro motor. The signal from the synchro motor actuates the indicator on the flight engineer's panel. (See figure 2.)

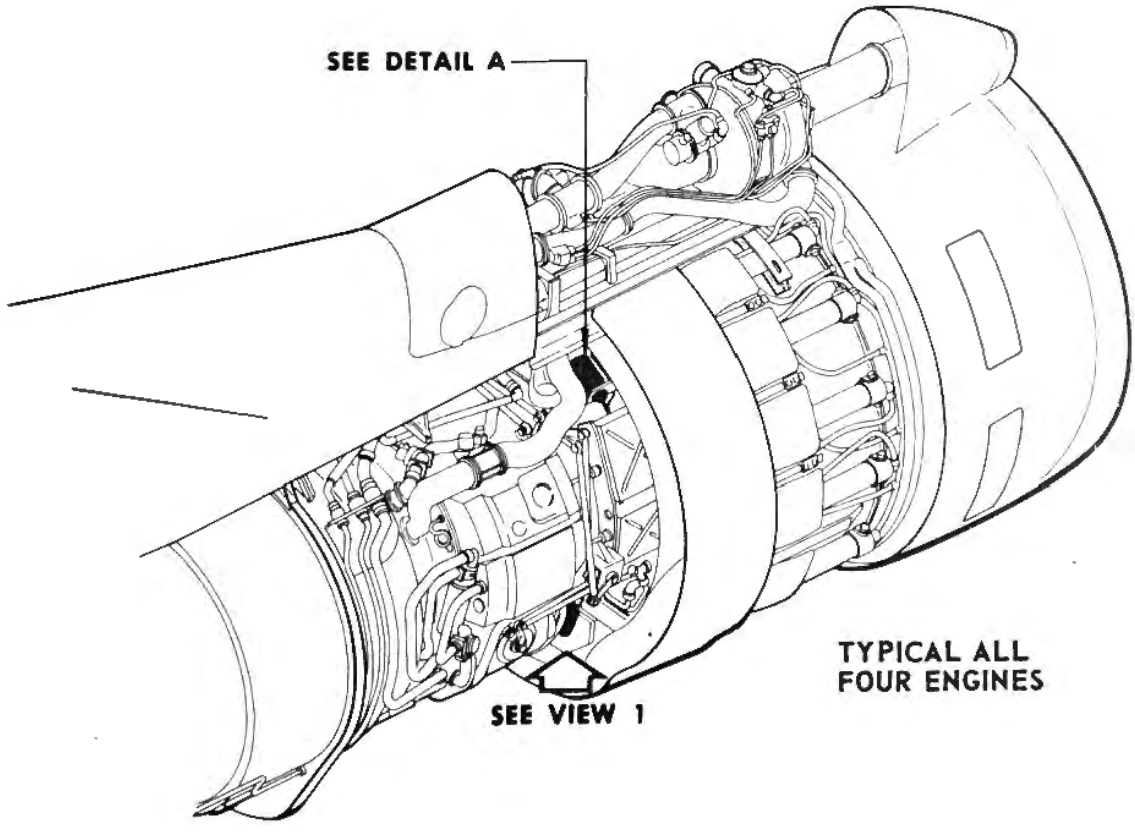
B. The oil pressure transmitter is mounted in an antivibration bracket at the 2 o'clock position on the right side of the engine just aft of the fan air outlet duct. The pressure port (P) is connected to the outlet side of the main oil strainer. On early power plant configurations the vent port is connected into the vented space of the accessory drive gearbox; on later power plant configurations, a drain port is installed in the transmitter vent port. (See figure 1.)

3. Oil Pressure Indicator

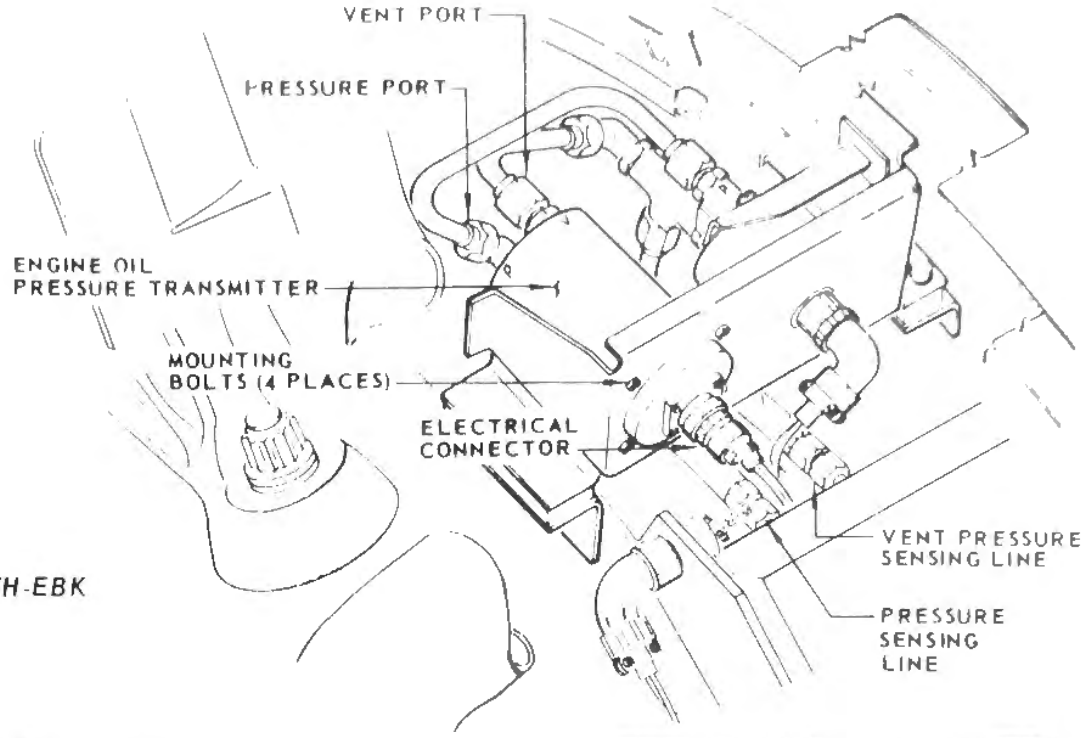
A. The signal from the transmitter causes rotation of the synchro motor in the indicator. This movement is transferred through a gear train to a pointer which travels over the indicator dial face.

B. Four indicators, one for each engine, are mounted in a horizontal row in the top right corner of the flight engineer's lower instrument panel. (See figure 1.)

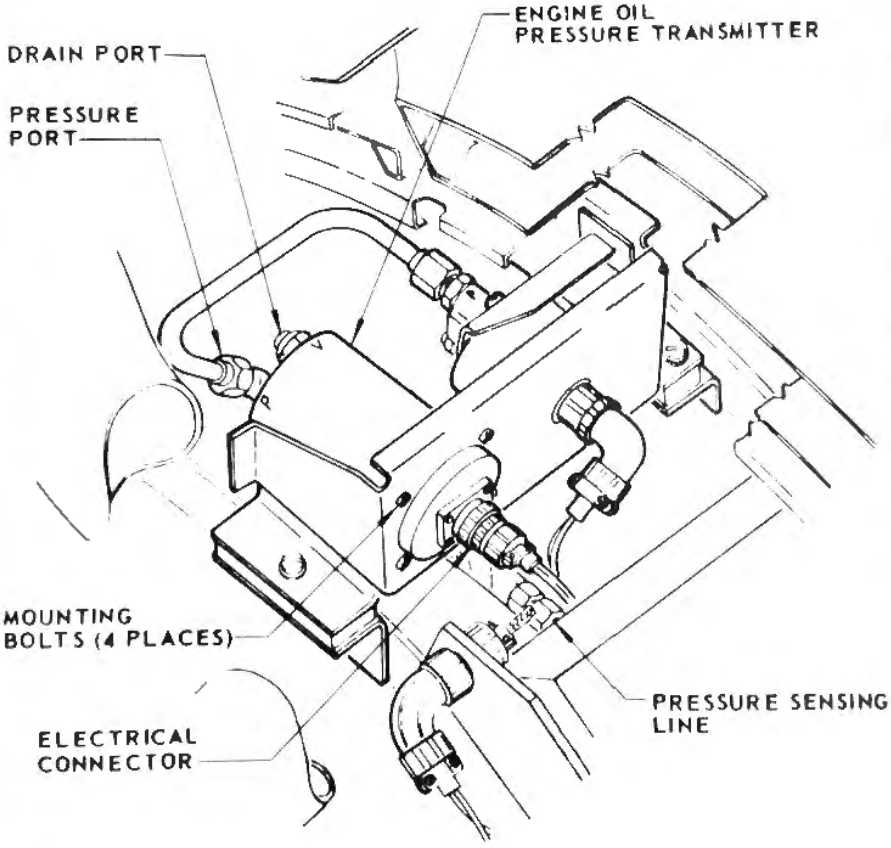




Oil Pressure Indicating System Component Location
Figure 1 (Sheet 1 of 2)

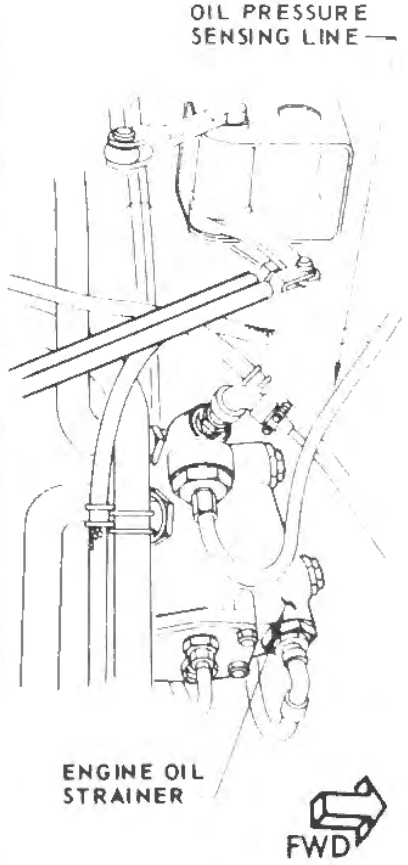


VH-EBA THRU VH-EBK



VH-EBL AND ON

DETAIL A



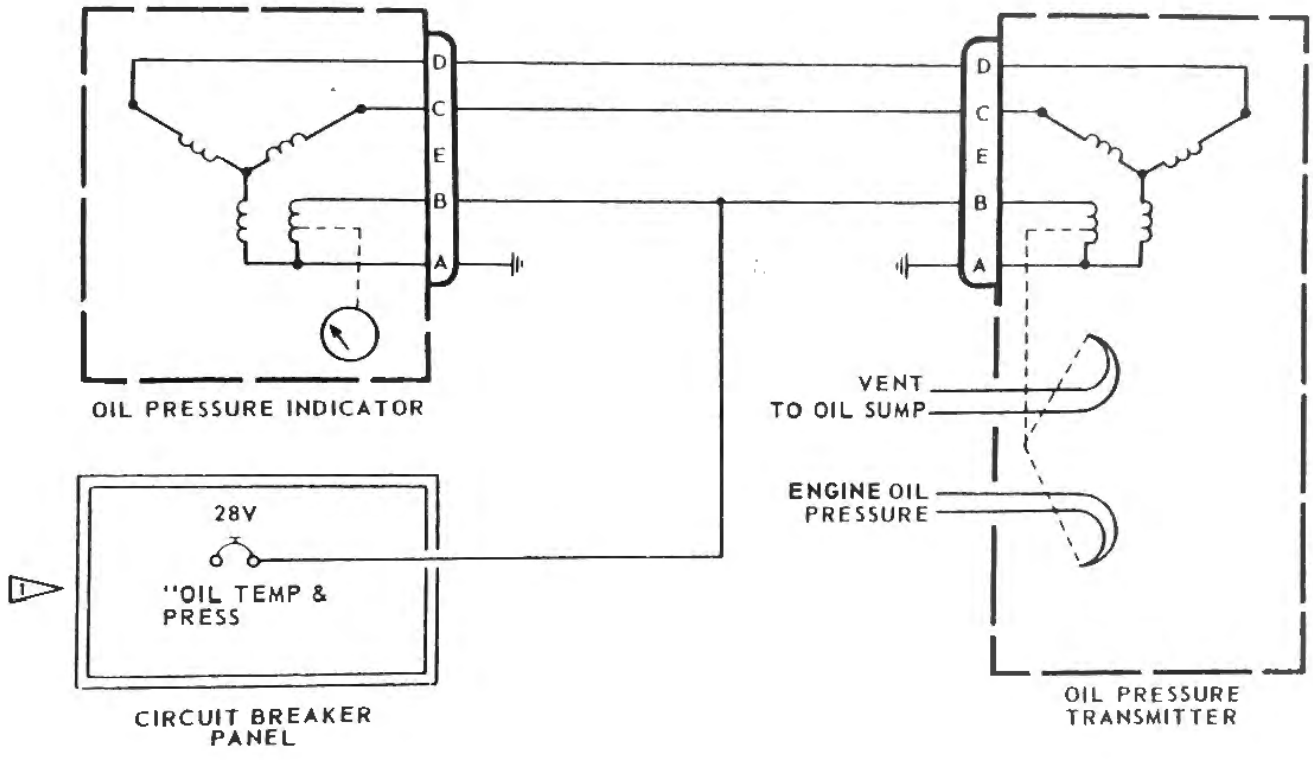
VIEW 1

Oil Pressure Indicating System Component Location
Figure 1 (Sheet 2 of 2)

4. Operation

A. As the synchro motor in the transmitter and the indicator are matched, any movement of the transmitter synchro is exactly repeated by the indicator synchro. Suitable gearing in the indicator reduces this motion to a deflection of a pointer across the oil pressure indicator dial scale.

B. Electrical power for the system is 28 volts, 400-cycle ac. Circuit breakers for each engine are as shown in figure 2. If power is interrupted the oil pressure indicator will remain showing the pressure recorded by the system at the moment of disconnection.



Engine No. 1	28 Volt A-C Circuit Breaker Panel (P 7)
Engine No. 2	A-C Bus No. 2 Circuit Breaker Panel (P2)
Engine No. 3	A-C Bus No. 3 Circuit Breaker Panel (P 3)
Engine No. 4	A-C Bus No. 4 Circuit Breaker Panel (P 4)

Oil Pressure Indicating System Circuit
Figure 2

OIL PRESSURE INDICATING SYSTEM - TROUBLE SHOOTING

EFFECTIVITY

AA707-123B AND QANTAS 707-138B

With external power connected and all applicable circuit breakers closed, observe operation of oil pressure indicator while starting, operating, and shutting down engine. IF -

INDICATOR INACCURATE

Interchange indicator with one that is known to operate. IF -

NOT OK - Check for power and ground at indicator. IF -

OK - Replace indicator.

OK - Check for power and ground at transmitter. IF -

NOT OK - Repair wiring to ground or from circuit breaker panel.

OK - Check oil pressure and vent lines for leaks or restrictions. IF -

NOT OK - Repair wiring to ground or from circuit breaker panel.

OK - Check continuity of wiring between indicator and transmitter. IF -

NOT OK - Repair oil pressure and/or vent lines.

OK - Replace transmitter.

NOT OK - Repair wiring between indicator and transmitter.

END

OIL PRESSURE INDICATING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Pressure Indicating System

A. Equipment and Materials

(1) Air pressure source, adjustable 0 to 100 psi.

B. Test Oil Pressure Indicating System

(1) Connect external power to the airplane and determine that applicable oil pressure indicating system circuit breaker is closed.

(2) Open right side cowl panel.

(3) Disconnect oil pressure line at fitting on oil strainer and connect adjustable air pressure source to the disconnected line. (See figure 201.)

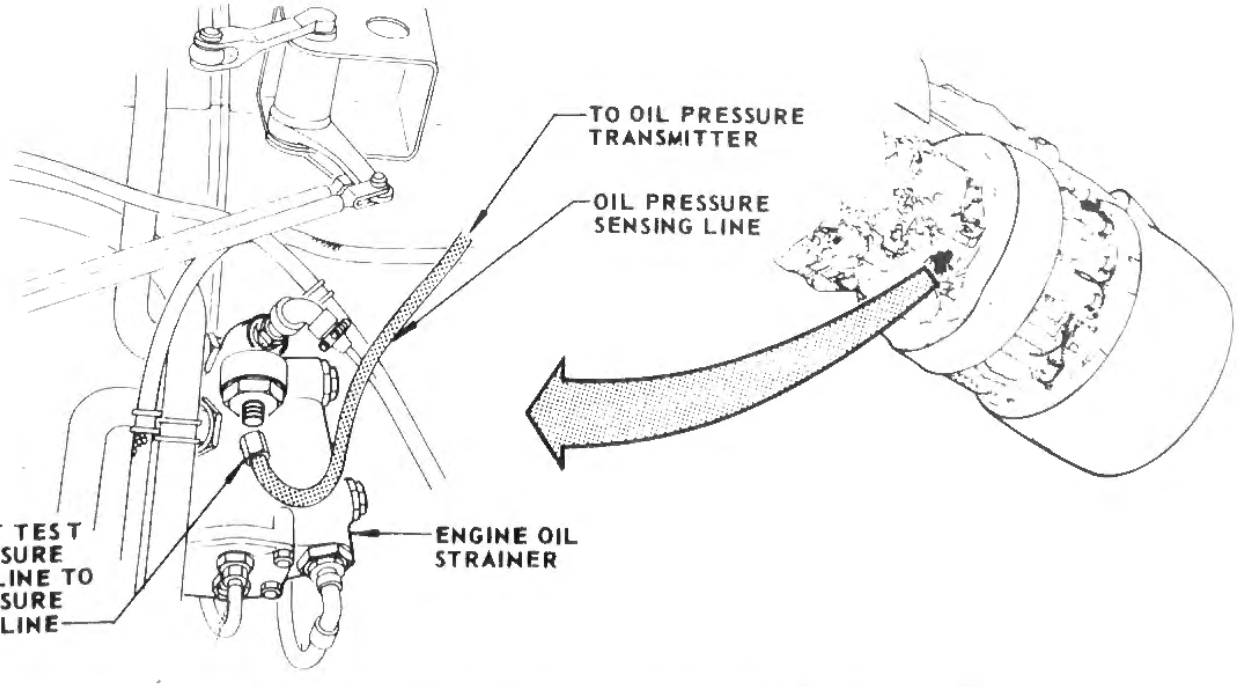
(4) Apply air pressure to 100 psig and observe reading of corresponding oil pressure indicator. Indicator should read 100 ± 3 psig.

(5) Hold pressure for 3 minutes. There should be no leakage.

(6) Adjust air pressure to 50 psig. Indicator should read 50 ± 3 psig.

(7) Reduce pressure and remove adjustable air pressure source. Indicator should read zero.

(8) Reconnect oil pressure line to oil strainer close right side cowl panel and remove external power.



Oil Pressure Indicating System Test Connections
Figure 201

OIL PRESSURE TRANSMITTER - MAINTENANCE PRACTICES

1. Removal/Installation Oil Pressure Transmitter

A. Remove Oil Pressure Transmitter

(1) Open applicable oil pressure indicating system circuit breaker.

(2) Open right side cowl panel and disconnect electrical plug from oil pressure transmitter. (See figure 201.)

(3) Disconnect pressure line from union oil pressure transmitter.

(4) On power plants with vent plumbing installed between oil pressure transmitter "V" port and accessory drive gearbox, disconnect vent line from union on oil pressure transmitter.

(5) Support transmitter and remove mounting bolts securing transmitter to mounting bracket.

(6) Remove transmitter from bracket.

(7) If transmitter is to be replaced with a new unit, remove union(s) and O-rings. Remove drain port, if installed, in transmitter vent port.

B. Install Oil Pressure Transmitter

(1) If a new oil pressure transmitter is being installed on a power plant with vent plumbing between oil pressure transmitter and accessory drive gearbox, install unions on transmitter using new O-ring.

(2) If a new oil pressure transmitter is being installed on power plants without vent plumbing between oil pressure transmitter and accessory drive gearbox, install union in transmitter "P" port and install drain port in transmitter "V" port using new O-rings.

(3) Place transmitter in mounting bracket so that "P" port is aft and "V" port is forward. (See figure 201.)

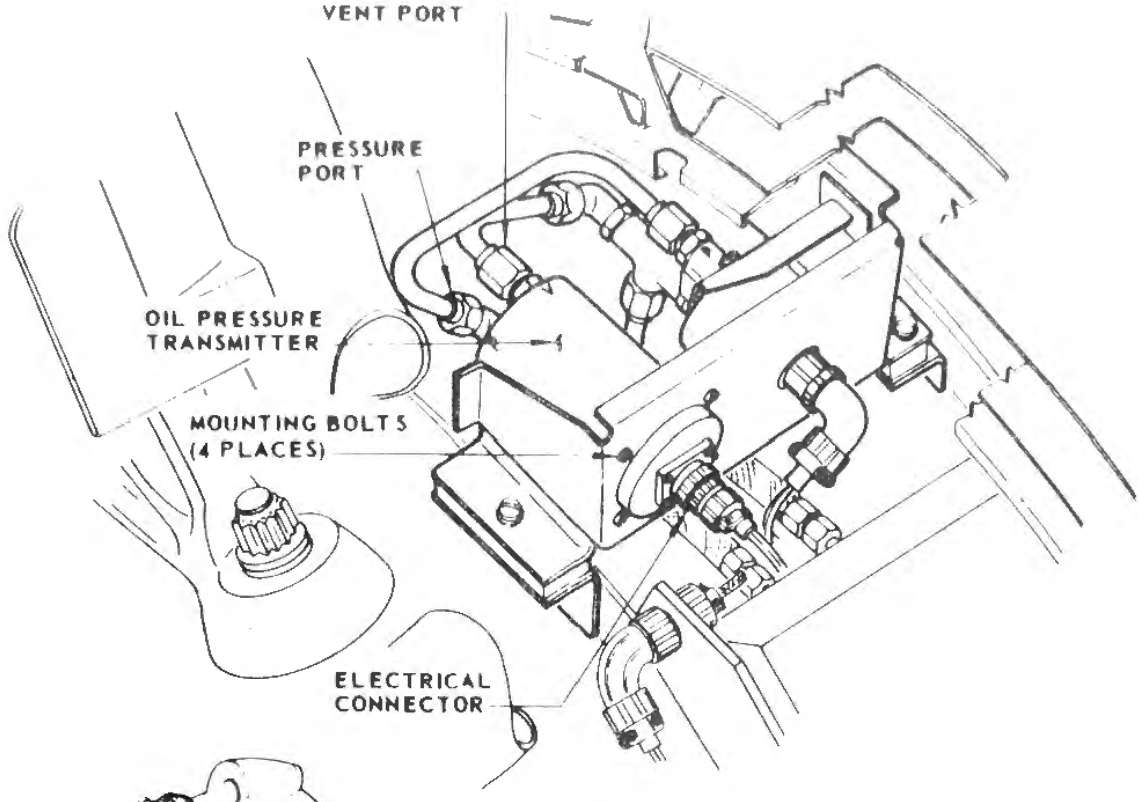
(4) Install mounting bolts securing transmitter to mounting bracket.

(5) Connect pressure line to "P" port.

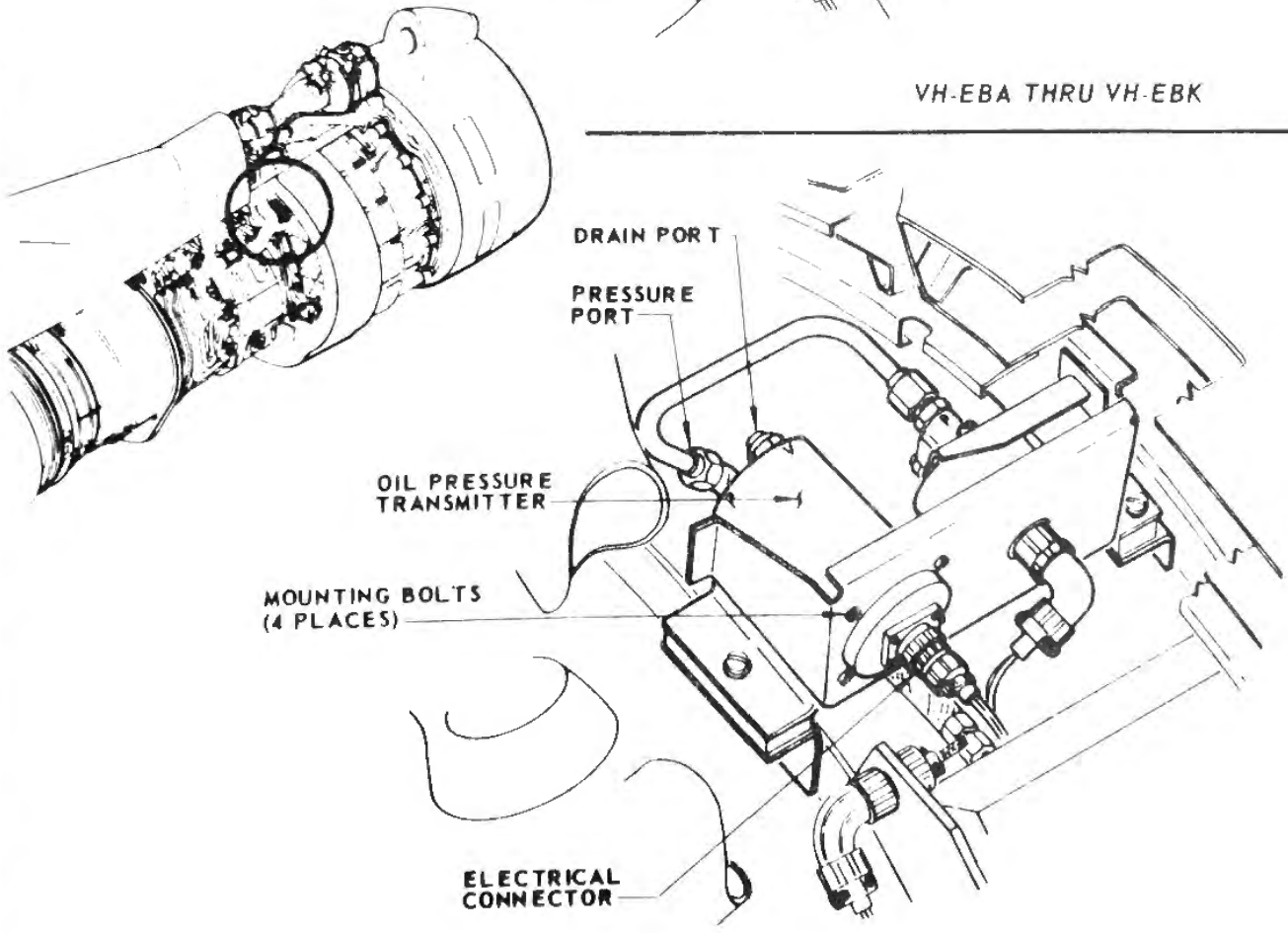
(6) If vent plumbing is installed between oil pressure transmitter and accessory drive gearbox, connect vent line to "V" port of transmitter.

(7) Connect electrical plug and close right side cowl panel.

(8) Close applicable oil pressure indicating system circuit breaker.



VH-EBA THRU VH-EBK



VH-EBL AND ON

Oil Pressure Transmitter Installation
Figure 201

OIL TEMPERATURE INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil temperature indicating system provides visual indication of oil temperature in each engine. The system consists of four oil temperature indicators on the flight engineer's lower panel and four temperature bulbs, one at each engine. (See figure 1.)

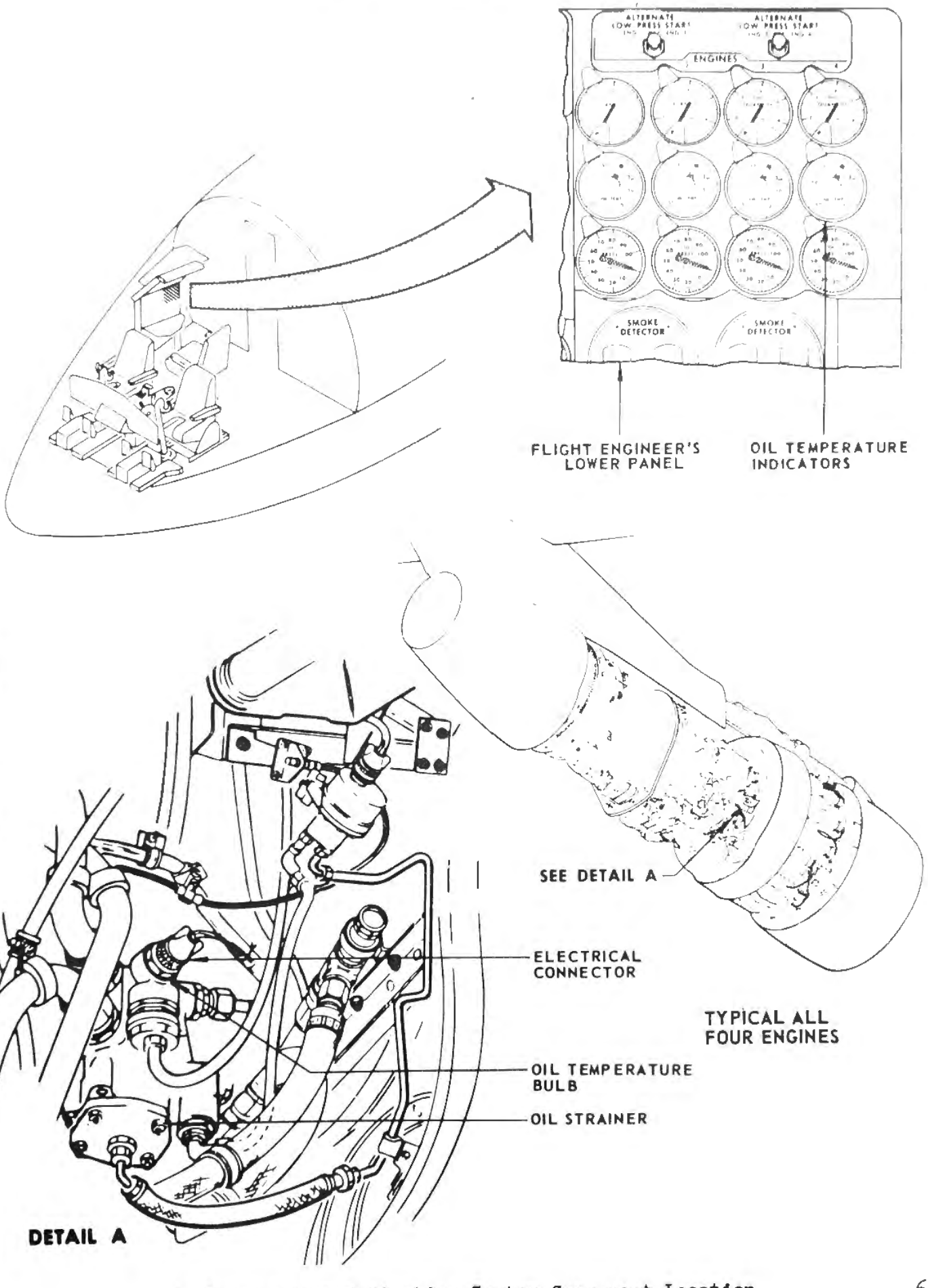
B. Each temperature bulb contains a resistance element which changes resistance with changes in temperature. This resistance element controls the current passing through the meter movement of the oil temperature indicator. Power is supplied to the system through 28-volt a-c circuit breakers. (See figure 2.)

2. Oil Temperature Bulb

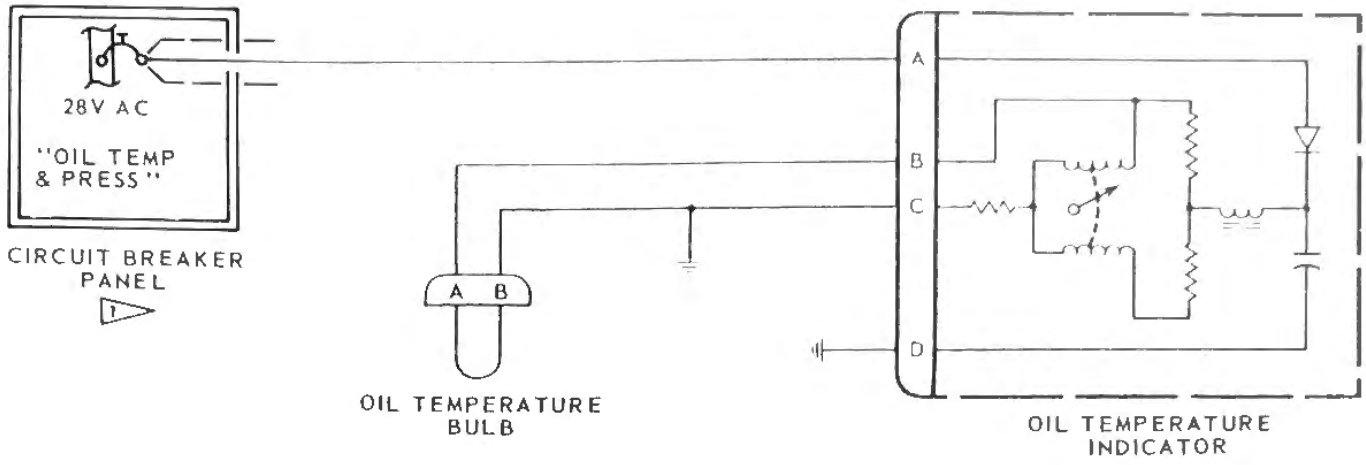
A. The oil temperature bulb has an operating range of -70° to +300°C. The resistance at 0°C is 90.38 ohms. The temperature bulb has an armoured envelope which screws into a housing on the outlet side of the oil strainer. (See figure 1.) The temperature bulb is in direct contact with the oil and when removed will cause draining of the oil pressure delivery lines.

3. Oil Temperature Indicator

A. The oil temperature indicator is a resistance ratiometer type instrument. It is located on the flight engineer's lower panel. The indicator operates on the ratio of the currents through two coils in the meter movement. The ratio of these currents is determined by the resistance of the temperature bulb. The indicator dial is calibrated in degrees centigrade and reads from -70° to +150°C. (See figure 1.) With power off, the pointer remains off scale at the low temperature end. Electrical connections are made to the indicator through a disconnect plug.



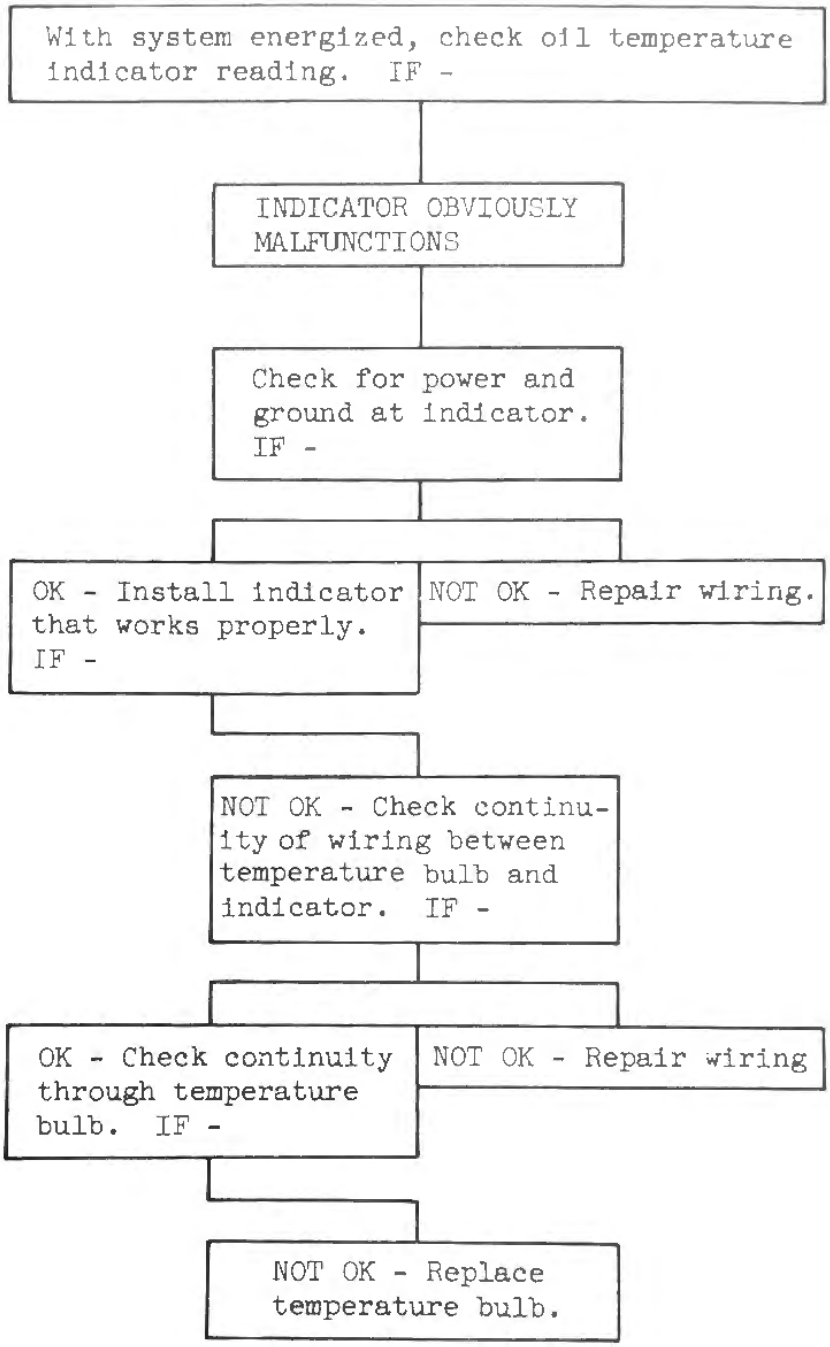
Oil Temperature Indicating System Component Location
Figure 1



1 Engine No. 1 - 28 Volt A-C Circuit Breaker Panel (P7)
Engine No. 2 - A-C Bus No. 2 Circuit Breaker Panel (P2)
Engine No. 3 - A-C Bus No. 3 Circuit Breaker Panel (P3)
Engine No. 4 - A-C Bus No. 4 Circuit Breaker Panel (P4)

Oil Temperature Indicating System Circuit
Figure 2

OIL TEMPERATURE INDICATING SYSTEM - TROUBLE SHOOTING



OIL TEMPERATURE INDICATING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Temperature Indicating System

   A. General

      (1) Testing the oil temperature indicating system is accomplished by establishing a temperature at the oil temperature bulb, measuring that temperature with a master thermometer, and comparing the readings of the oil temperature indicator and the master thermometer.

   B. Equipment and Materials

      (1) Unbreakable master thermometer - calibrated in either °C or °F. (See 79-9-1, figure 202, for conversion.)

      (2) Variable temperature oil bath.

   C. Test Oil Temperature Indicating System

      (1) Connect external power to airplane.

      (2) Open applicable oil temperature indicator circuit breaker.

      (3) Open right side cowl panel, disconnect electrical plug, and remove oil temperature bulb.

      (4) Reconnect electrical plug and close applicable oil temperature indicator circuit breaker.

      (5) Submerge sensing portions of master thermometer and oil temperature bulb in hot oil bath.

      (6) Compare readings of master thermometer and oil temperature indication at several temperatures. Readings should agree within 3° Centigrade.

      (7) Open applicable oil temperature indicator circuit breaker, disconnect electrical plug, and install oil temperature bulb.

      (8) Connect electrical plug, close right side cowl panel, and close oil temperature indicator circuit breaker.

OIL TEMPERATURE BULB - MAINTENANCE PRACTICES

1. Removal/Installation Oil Temperature Bulb

A. Remove Oil Temperature Bulb

(1) Open applicable "OIL TEMP & PRESS" circuit breaker. (See 79-9-0, figure 2.)

(2) Open right side cowl panel.

(3) Locate bulb on oil strainer and remove electrical connector. (See figure 201.)

(4) Remove oil temperature bulb.

NOTE: When the oil temperature bulb is removed oil will drain from the oil pressure delivery line.

B. Install Oil Temperature Bulb (See figure 201.)

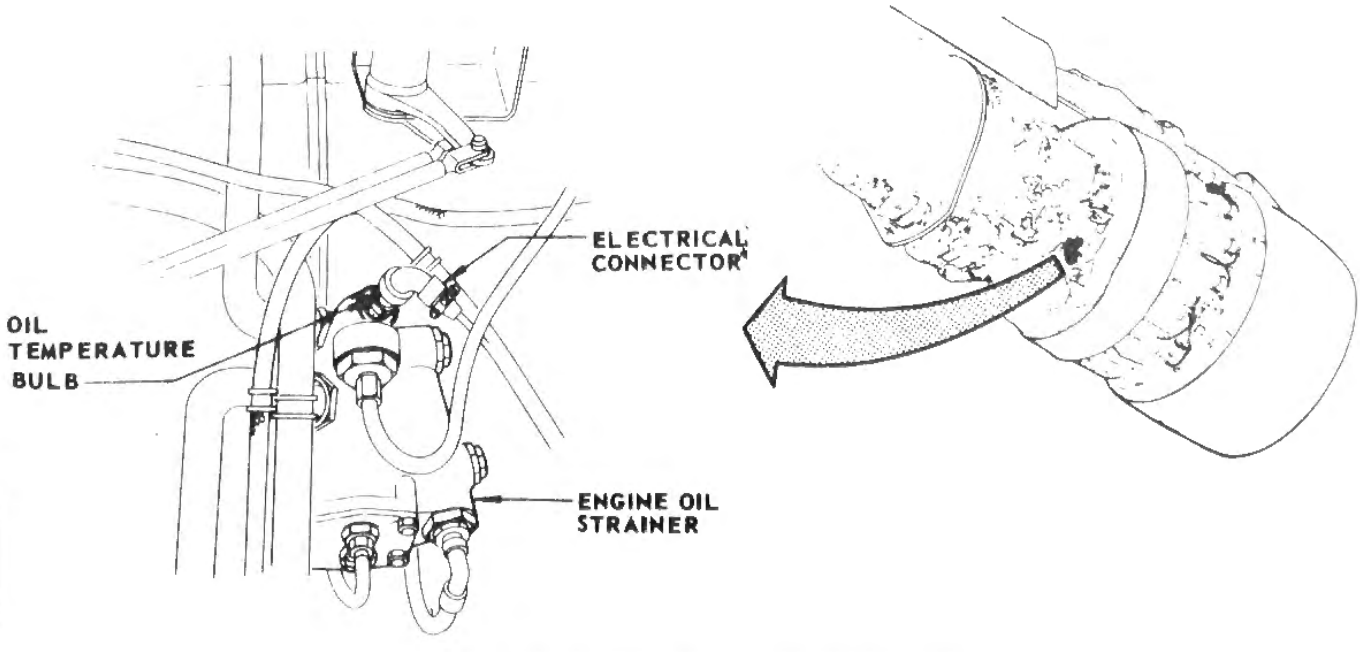
(1) Install temperature bulb in threaded socket on oil strainer using a new copper-asbestos fluid seal.

(2) Connect electrical plug.

(3) Close right side cowl panel.

NOTE: Before closing cowl panel check that oil in engine oil tank has not been drained below a safe level.

(4) Close "OIL TEMP & PRESS" circuit breaker on applicable panel.



Oil Temperature Bulb Installation
Figure 201

2. Adjustment/Test Engine Oil Temperature Bulb

A. General

(1) The oil temperature bulb has no provisions for adjustment and only a test for accuracy can be performed on it. To test the bulb, the resistance across the bulb connections is measured and compared with values found on the chart of temperature resistance values. (See figure 202.) The bulb temperature may be measured by allowing the bulb and a master thermometer to come to a common temperature. If an extended temperature range test is required, the temperature bulb and a master thermometer should be immersed in a variable temperature water or oil bath.

B. Equipment and Materials

(1) A precision ohmmeter or bridge tester.

(2) A master thermometer, mercury type, calibrated in degrees centigrade.

(3) Water or oil bath if conditions require.

C. Test Oil Temperature Bulb

(1) Open OIL TEMP IND circuit breaker on applicable a-c circuit breaker panel. (See 77-9-0, figure 2.)

(2) Obtain access to oil temperature bulb (See figure 201.) by opening right side cowl panel on applicable engine.

(3) Disconnect electrical plug and remove temperature bulb.

(4) Allow temperature bulb and master thermometer to reach ambient temperature, or place sensing portions of temperature bulb and thermometer in oil or water bath until a steady temperature is reached. Record temperature shown on master thermometer.

(5) Measure resistance of temperature bulb by connecting leads of ohmmeter to its A (+) and B (-) terminals. Compare resistance value from chart with resistance value measured across bulb connections. They should agree within the limits shown. If they do not agree, replace with a serviceable temperature bulb.

TEMPERATURE		RESISTANCE (OHMS)	TEMPERATURE		RESISTANCE (OHMS)
° C	° F		° C	° F	
-20	-4	83.77±.40	+70	+158	116.27±.50
-10	+14	87.04±.40	+80	+176	120.36±.50
0	+32	90.38±.40	+90	+194	124.55+.50
+10	+50	93.80±.40	+100	+212	128.85+.50
+20	+68	97.31±.40	+110	+230	133.26±.50
+30	+86	100.91±.40	+120	+240	137.78±.60
+40	+104	104.60±.40	+130	+266	142.40±.60
+50	+122	108.39±.40	+140	+284	147.11±.60
+60	+140	112.28±.50			

CONVERSION:

°C TO °F °F = 9/5 °C + 32

°F TO °C °C = 5/9 (°F - 32)

Oil Temperature Bulb - Temperature Resistance Values
Figure 202

END

TEMPERATURE		RESISTANCE (OHMS)	TEMPERATURE		RESISTANCE (OHMS)
° C	° F		° C	° F	
-20	-4	83.77±.40	+70	+158	116.27±.50
-10	+14	87.04±.40	+80	+176	120.36±.50
0	+32	90.38±.40	+90	+194	124.55+.50
+10	+50	93.80±.40	+100	+212	128.85+.50
+20	+68	97.31±.40	+110	+230	133.26±.50
+30	+86	100.91±.40	+120	+240	137.78±.60
+40	+104	104.60±.40	+130	+266	142.40±.60
+50	+122	108.39±.40	+140	+284	147.11±.60
+60	+140	112.28±.50			

CONVERSION:

°C TO °F °F = 9/5 °C + 32

°F TO °C °C = 5/9 (°F - 32)

Oil Temperature Bulb - Temperature Resistance Values
Figure 202

END

OIL PRESSURE WARNING SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The oil pressure warning system provides the pilot with warning of low engine oil pressure. On airplanes VH-EBL and on, the system also provides an indication when contaminated oil is about to bypass (or is bypassing) the engine oil strainer.

B. When the oil pressure switch senses a differential pressure below approximately 32 psi, the switch closes, illuminating the oil pressure warning light. On airplanes VH-EBL and on, the oil pressure warning light may also be illuminated by the oil strainer bypass switch which closes at approximately 50 psi differential pressure. To determine which switch has actuated the warning light, the applicable oil pressure indicator on the flight engineer's panel must be observed. A normal oil pressure indicates that the oil strainer is clogged with contaminated oil.

C. Electrical power for the oil pressure warning system is 28 volt dc through the radio and T-R circuit breaker panel (P5).

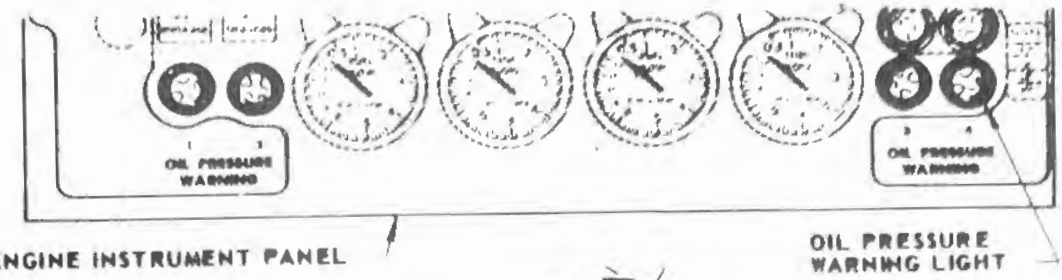
2. Oil Pressure Switch

A. The oil pressure switch senses the differential between engine oil pressure and engine vent pressure. The switch opens at a maximum differential pressure of 36 psi and the warning light goes out. (See figure 2.)

B. The oil pressure switch is mounted on the forward compressor case, below the fan air outlet duct, on the right side of the engine. (See figure 1.)

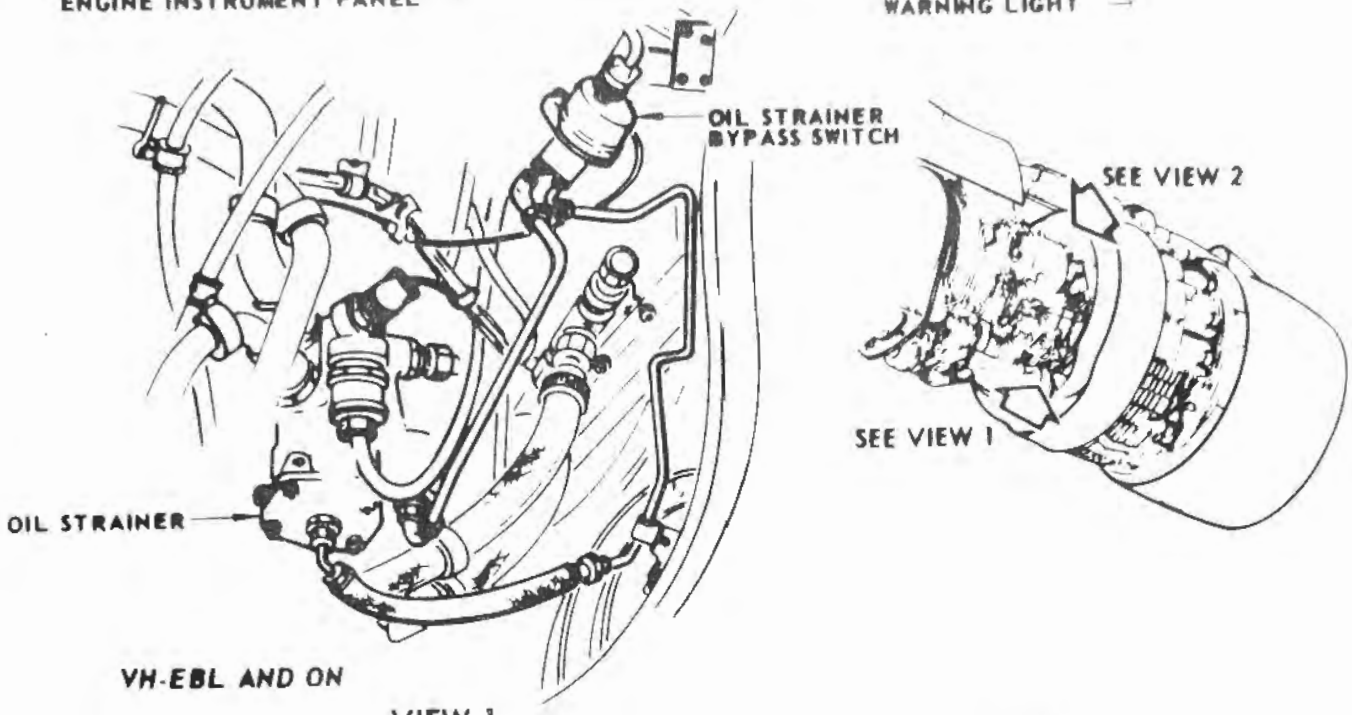
3. Oil Strainer Bypass Switch (VH-EBL and on)

A. The oil strainer bypass switch senses the pressure differential between the inlet and outlet fittings on the engine oil strainer. The switch provides a warning when the oil strainer is clogged and bypassing contaminated oil.



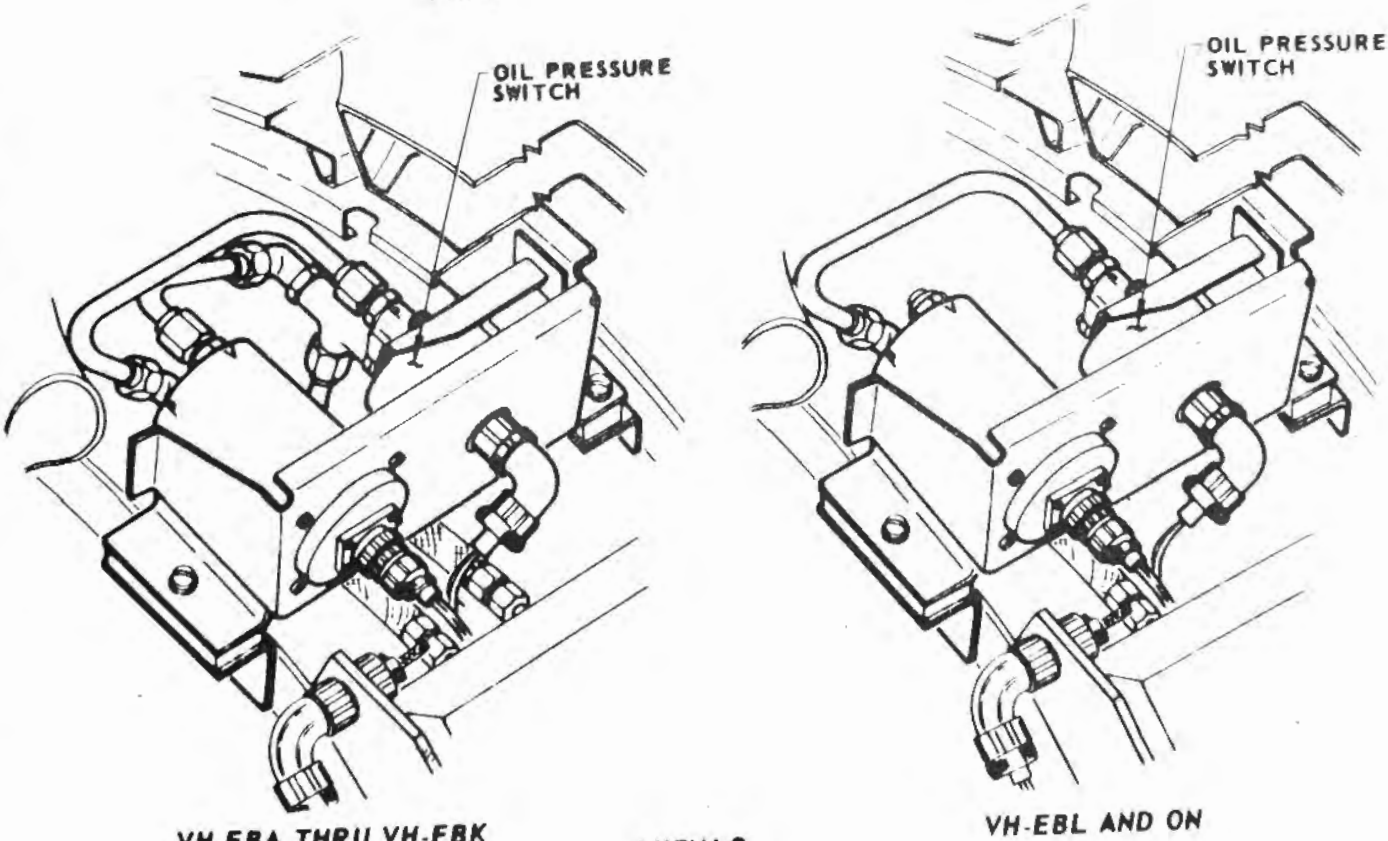
ENGINE INSTRUMENT PANEL

OIL PRESSURE WARNING LIGHT



VH-EBL AND ON

VIEW 1



VH-EBA THRU VH-EBK

VIEW 2

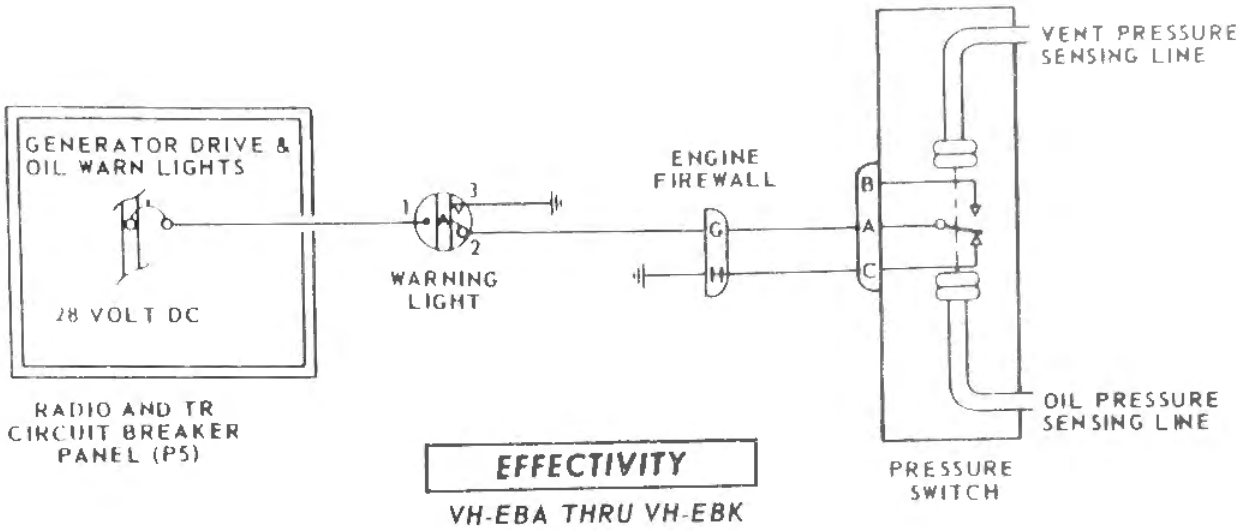
VH-EBL AND ON

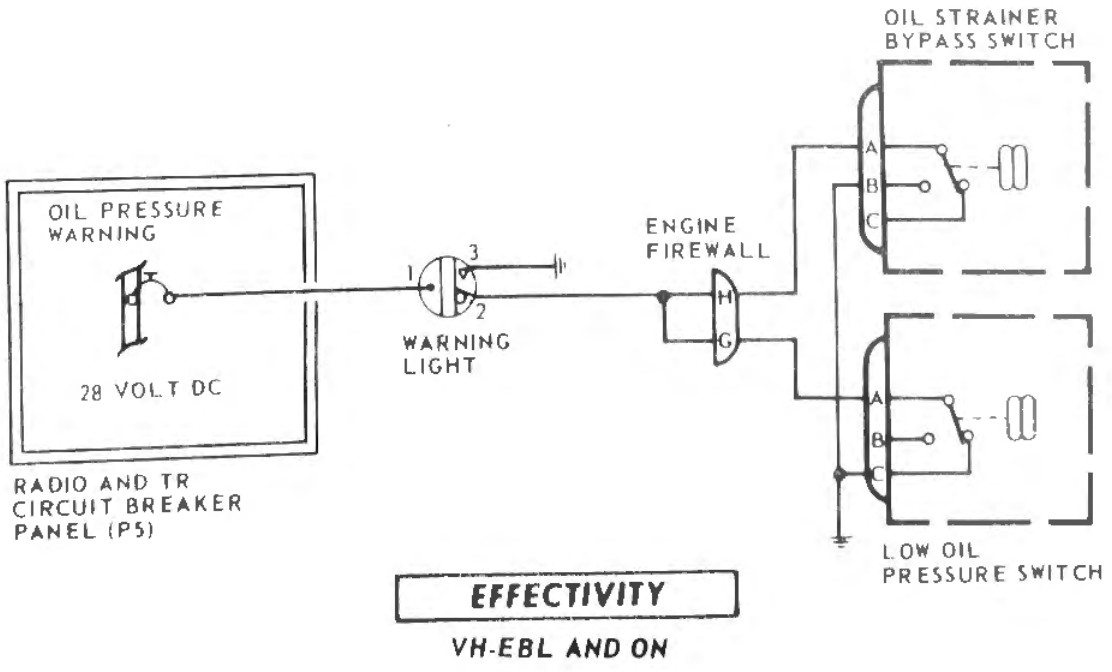
Oil Pressure Warning System Equipment Location
Figure 1

B. The oil strainer bypass switch is mounted on the throttle control support structure on the right side of the engine slightly aft of the fan air outlet duct. (See figure 1.)

4. Oil Pressure Warning Light

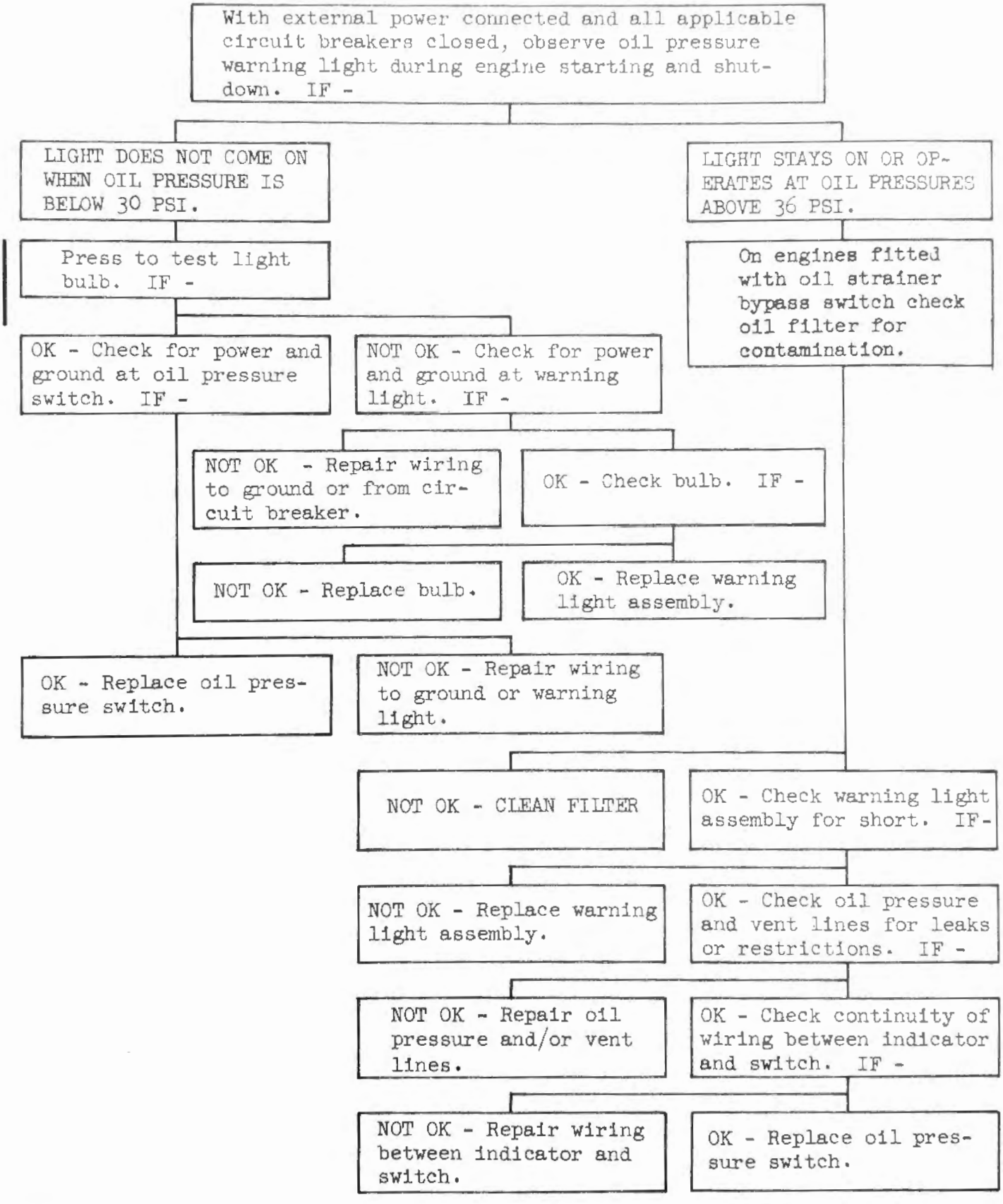
A. The oil pressure warning light is a press-to-test indicator light with an integral dimmer feature. (See figure 2.) The warning lights are located along the lower edge of the engine instrument panel. (See figure 1.)





Oil Pressure Warning System Circuit
Figure 2

OIL PRESSURE WARNING SYSTEM - TROUBLE SHOOTING



OIL PRESSURE WARNING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test Oil Pressure Warning System

A. General

(1) The oil pressure warning system has two functions; it indicates when the engine oil pressure is below safe operating limits, or when the main oil filter has become clogged and is about to bypass unfiltered oil into the engine lubrication system. A separate switch is installed for each warning function.

(2) The low oil pressure warning function of the system can be tested in two different ways. The test may be performed during the normal starting and run-up of an engine, or by attaching an air source to the oil pressure sensing line. When an engine is started or shutdown, operation of the oil pressure warning light can be checked against the corresponding oil pressure indicator, on the flight engineers panel.

(3) Testing the oil strainer bypass warning function is done by attaching an air source to the high pressure hose of the oil strainer bypass switch.

B. Equipment and Materials

(1) Variable Air Pressure Source with Gage - 60 psig minimum pressure

C. Test Oil Pressure Warning System (Low Oil Pressure Function)

(1) During Engine Run-up

(a) With system energized, determine that warning light is on before starting engine.

(b) During engine start, note pressure at which warning light goes out. Light should go out with increasing pressure before or at 36 psig.

(c) When engine is shut-down, note pressure at which pressure warning light comes on. Light should come on as pressure decreases to 28 psig.

(2) Using Air Pressure Source

(a) Open right side cowl panel.

(b) With system energized, determine that warning light is on before connecting air source.

(c) Disconnect oil pressure sensing line from oil strainer and gradually apply air pressure to oil pressure switch. Pressure warning light should go out with increasing pressure before or at 36 psig.

CAUTION: DO NOT OVER-PRESSURIZE OIL PRESSURE SWITCH OR DAMAGE TO UNIT WILL OCCUR.

(d) Gradually reduce pressure until pressure warning light comes on. Light should come on as pressure decreases to 28 psig.

(e) Remove pressure and reconnect pressure sensing line at oil strainer.

(f) Proceed with test of oil strainer bypass function of oil pressure warning system.

D. Test Oil Pressure Warning System (Oil Strainer Bypass Function - Airplane VH-EBL and on)

(1) Remove electrical connectors from oil pressure switch and oil strainer bypass switch. Short pins A and B on the oil strainer bypass switch connector. Light should come on.

(2) Disengage applicable circuit breaker. Light should go out.

(3) Connect electrical connector to oil strainer bypass switch and install lockwire.

(4) Disconnect the strainer inlet pressure sensing hose at the fitting in the strainer cover. Cap strainer fitting to minimize oil loss.

(5) Energize oil pressure warning system.

(6) Connect variable air pressure source to strainer inlet pressure sensing hose and gradually apply air pressure to oil strainer bypass switch. Switch should close and warning light should illuminate at 50 ± 1.5 psig.

(7) Slowly decrease pressure and check warning light operation. Switch should open, turning off the warning light, by 44 psig.

(8) Remove air pressure source and connect oil strainer inlet pressure sensing hose to fitting on oil strainer cover.

(9) Connect electrical connector to low oil pressure switch and install lockwire.

(10) Close right side cowl panel.

QANTAS

MANUFACTURER'S PUBLICATION REVISION

BOEING 707 STRATOLINER MAINTENANCE MANUAL

QANTAS REVISION NO. 7

QANTAS
TECHN... UBLICATIONS
REG. NO. Dec 4004/11
Dated

General.

This revision sheet provides Company instructions and procedures supplementary to or superseding those contained in the above publication.

Action.

Insert this page adjacent to Chapter 79-10-0, Page 202 and enter details on revision list at the front of the Maintenance Manual.

Authority.

ETM.432/8-79-30.

TEST OIL PRESSURE WARNING SYSTEM (OIL STRAINER BY PASS FUNCTION - AIRCRAFT VH-EBA-EBM).

1. Aircraft applicability in paragraph D to include aircraft VH-EBA - VH-EBK.

2. The tolerance referred to in Paragraph D (6) is to be disregarded and instead the following tolerance shall apply:-

$$50 \begin{smallmatrix} -2 \\ +4 \end{smallmatrix} \text{ P.S.I.G.}$$

OIL PRESSURE SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation Oil Pressure Switch

NOTE: To remove and install the oil pressure switch the antivibration mounting bracket which supports the oil pressure transmitter and oil pressure switch must be taken off the engine.

A. Remove Oil Pressure Switch

(1) Open respective oil pressure warning circuit breaker.

(2) Remove electrical plug from oil pressure switch and oil pressure transmitter. (See figure 201.)

(3) Disconnect oil pressure sensing line at junction of flex lines and engine tubing.

(4) On power plants fitted with vent plumbing between accessory drive gearbox and oil pressure switch, disconnect vent line at junction of flex line and engine tubing.

(5) Remove 3 antivibration bracket mounting screws and remove bracket assembly.

(6) Remove pressure sensing line(s) from switch. Remove switch mounting screws and lift switch out of sub-bracket.

(7) If oil pressure switch is to be replaced with a new unit, remove union(s), O-rings and/or drain port.

B. Install Oil Pressure Switch

(1) If a new unit is being installed on a power plant fitted with vent plumbing between accessory drive gearbox and oil pressure switch, install unions in switch using new O-rings.

(2) If a new unit is being installed on a power plant that is not fitted with vent plumbing, install union in switch "P" port and install drain port in switch "V" port using new O-rings.

(3) Attach oil pressure switch to sub-bracket with mounting screws. (See figure 201.)

(4) Connect pressure sensing flex hose(s) to switch.

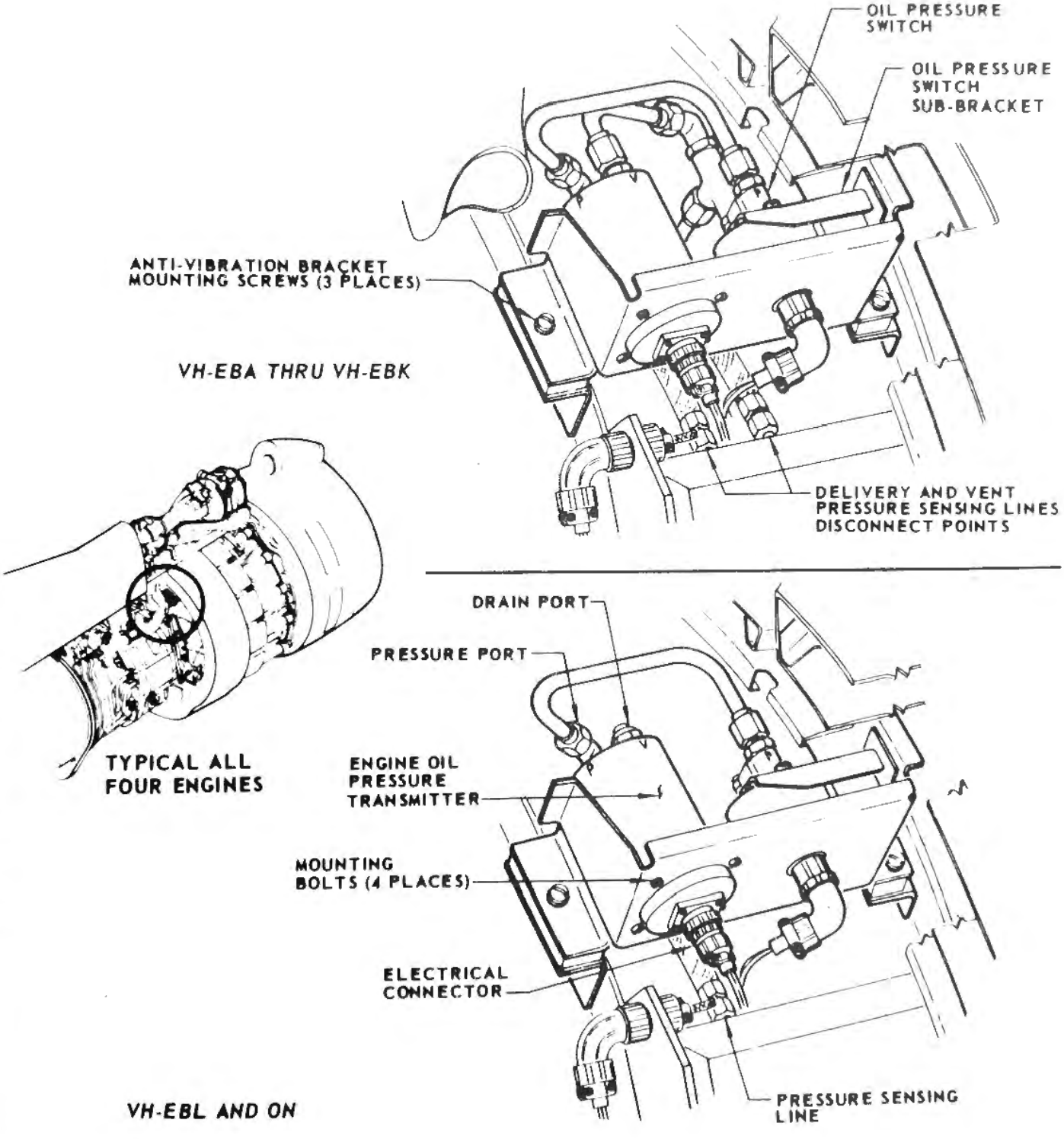
(5) Install antivibration bracket assembly to mounts on engine flanges.

(6) Connect oil pressure flex line to engine tubing.

(7) On power plants fitted with oil vent plumbing connect vent flex line to vent tubing.

(8) Connect the two electrical plugs.

(9) Close respective oil pressure warning circuit breaker.



Oil Pressure Switch Installation
Figure 201

OIL STRAINER BYPASS SWITCH - MAINTENANCE PRACTICES

EFFECTIVITY

QANTAS VH-EBL AND ON

1. Removal/Installation Oil Strainer Bypass Switch

A. Remove Oil Strainer Bypass Switch

(1) Open respective oil pressure warning circuit breaker.

(2) Open right side cowl panel.

(3) Remove electrical plug from oil strainer bypass switch. (See figure 201.)

(4) Disconnect tubing between inlet side of strainer and switch "PRESS" port at elbow.

(5) Disconnect tubing between outlet side of strainer and switch "VENT" port at elbow.

(6) Remove two screws retaining switch mounting bracket to bracket at throttle control support structure and remove switch and bracket assembly.

(7) If switch is to be replaced by a new unit, remove elbows and O-rings from switch "VENT" and "PRESS" ports.

B. Install Oil Strainer Bypass Switch

(1) If a new switch is being installed, install elbows in switch using new O-rings.

(2) Install bracket and switch assembly on engine throttle control structure using two mounting screws.

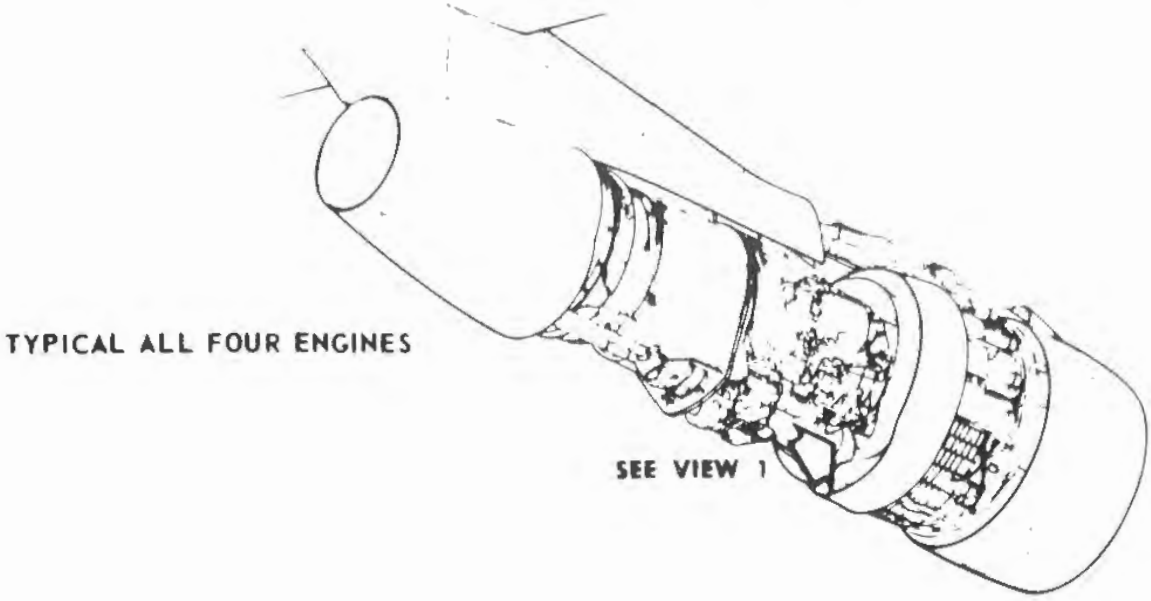
(3) Connect tubing from inlet side of strainer to elbow at switch "PRESS" port.

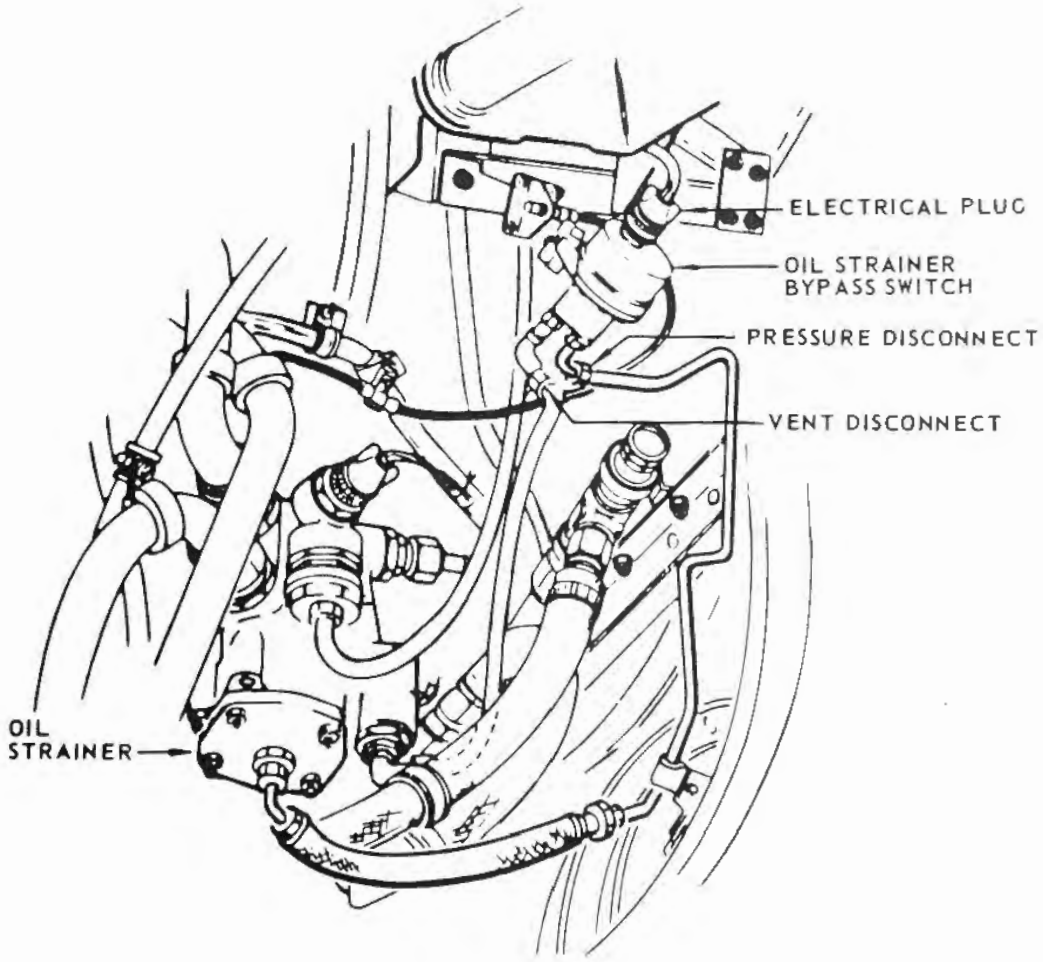
(4) Connect tubing from strainer outlet to switch "VENT" port.

(5) Connect electrical plug.

(6) Close respective oil pressure warning circuit breaker.

(7) Install right side cowl panel.





VIEW 1

Engine Oil Strainer Bypass Switch Installation
Figure 201